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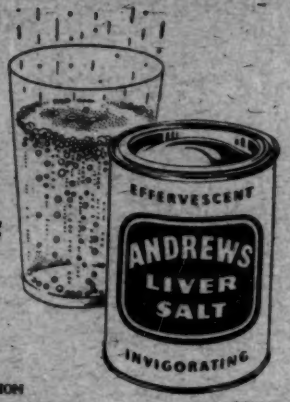

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY APRIL 10 1954

THE CONJOINED TWINS OF KANO

BY

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Professor of Surgery, University of London; Director of Surgical Studies, Postgraduate Medical School of London, Hammersmith Hospital

[WITH SPECIAL PLATE]

The term "conjoined (Siamese) twins" is usually applied to twins who are united bodily but possessed of separate personalities. It has therefore been used to include a great variety of twins monstrously joined, and has included partners who have shared various combinations of trunk and limbs. Those of surgical interest include the so-called "symmetrical conjoined twins," though this term is perhaps unfortunate in that conjoined twins are seldom completely symmetrical; they differ from each other usually to some degree in appearance, and their internal organs may partly or wholly each be a mirror image rather than a replica of their partner's.

Formation of Conjoined Twins

It is usually assumed that conjoined twins are monovular and due to fission of an embryo. If fission occurs at the stage of the inner cell mass before the embryonic disk has separated, separate twins result. If the twinning occurs after separation of the embryonic disk, there is only one amniotic sac. If the centres of axial growth are at this stage far enough apart there are separate twins in a single amniotic sac. If the centres of growth were not sufficiently separate the intermediate area between the two centres of axial growth might be shared and conjoined twins result (Potter, 1952).

It has never been completely proved that conjoined twins are in fact monovular. It is conceivable that separate twins might become joined from fusion of the closing edges of the neural grooves, for example, or from fusion of some other epithelial surfaces with their underlying mesodermal masses; but this would require disappearance of intervening amnion, a rare accident, as well as fusion of the twins. It is certainly curious that conjoined twins always differ from each other slightly in size and appearance, and are seldom so precisely identical as separate monovular twins are. Seventy-three per cent. of conjoined twins exhibit mirror imaging, while separate one-egg twins show this abnormality in only 22%, the mirror imaging taking the form of a degree of *situs inversus viscerum*, which has never been explained satisfactorily. I have a record, obtained directly from a traveller, of Chinese conjoined twins, one of whom was a eunuch. There is also a report of twins joined at the pelvis, one of whom suffered from hypertension (Jones *et al.*, 1948). In one reported pair there was a hare-lip deformity in the case of one only, and, as in the Townsend twins of Alberta (Allin, 1953), the heart is often normal in one twin but the seat of Fallot's tetralogy or some other congenital cardiac defect in the other. In this connexion it should, however, be remembered that in parabiosis of any kind one partner always becomes dominant. If two identical twins from a normal litter are artificially joined by parabiosis one almost invariably outgrows the other, contributing more to the total organism and taking more from the total organism than its partner. If conjoined twins were ever the result of the fusion of binovular embryos it would be likely that on some occasion a blood-group chimera would occur; this has never been demonstrated, but it apparently has never been sought.

Types of Twins

Conjoined twins may take the form of an *omphalopagus* (joined at the navel); a *xiphipagus* (joined at the lower sternum); a *thoracopagus* (joined in the chest); a *craniopagus* (joined by the heads); or a *pygopagus* (joined at the pelvis). The bridge of fusion may include an important internal organ. An omphalopagus may have a fusion of the two small intestines, or of the stomach, or of the liver. A craniopagus may have the two brains joined by a bridge of nervous tissue. When union is at the pelvis, urogenital organs may be shared, or if union is at the sacrum the spinal cords may be single at the level of the union. Rarely, one twin is included in the body cavity of the other as an "included foetus" (Farris and Bishop, 1950).

The frequency of occurrence of conjoined twins is difficult to ascertain. Potter reports one specimen of symmetrical joined twins in the Chicago Lying-in Hospital in 60,000 deliveries; during the same period there was no example of such union in embryos or foetuses. The frequency of reports of conjoined twins is increasing, but it would seem that this is due to the increasing accessibility of very large populations in Asia and Africa, to the greater possibility of the successful birth of conjoined twins in improved modern obstetrical circumstances, and to the lessening likelihood now of conjoined twins being sacrificed as monsters at birth. My belief is that we may expect each year, over the world as a whole, the birth of half a dozen or more conjoined twins capable of separation. A number of survivors from the operation of separation of Siamese twins have come to my notice in the past few months, and not all of these have been reported in the medical press.

Only a minority of conjoined twins seem to cause dystocia, though at least one case of obstructed labour from this cause is reported (Roxburgh, 1946).

Some Historical Examples

A number of conjoined twins have become historically famous. The earliest case on record seems to be that of the "Biddendon Maids" born in A.D. 1100 in England, united from hips to shoulders and with only one pair of upper and one pair of lower extremities shared between them. The "Florentine Twins," born in the fourteenth century and the subject of a bas-relief in the Church of La Scala and of a sonnet of Petrarch's, seem to have had three lower extremities between them and three upper, though successive mediaeval authors vary in their descriptions and illustrations (Belloni, 1950). The "Scottish Brothers," joined from the waist down but separate above it, lived for 28 years at the Court of James III of Scotland in the latter part of the fifteenth century. The opposite abnormality—one head and chest and a double abdomen and pelvis, with four inferior extremities—has also been described (Rohrbach, 1950). In the sixteenth century female conjoined twins with three legs, the central one equipped with ten toes, lived at Middleton, in England (Rueff, 1554), and during the same century there was a similar monster, carrying, however, only five toes on each of the three lower extremities, alive at Viaban in France. The "Hungarian Sisters" were born at Szorny in 1701 and survived in a convent for 22 years. The famous "Siamese Twins," Chang and Eng (1811–74), have been fully documented elsewhere (Luckhardt, 1941). Born of Chinese parents in Siam in 1811 as a xiphipagus, they were discovered at the age of 13 by a British merchant. Removed to North America, they were shown in his circus by Barnum, married English sisters, and settled down as farmers in North Carolina under the name of Bunker. As in the case of most other conjoined twins, when one died the other refused separation. Other conjoined twins include the "Sardinian Sisters" (1829–?), the Negro slave sisters Millie-Christine (1851–?), the "Bohemian Sisters" Rosa-Josepha Blazek (1878–1922), and many subsequent examples (Newman, 1942). There are at least three dozen fully documented instances in the literature of conjoined twins born alive. Hindu twins, Guarabai and Guaganbai, were on exhibition at the Paris Exposition of 1931. The Godino twins, born in the Philippines, applied for United States' citizenship. They were perplexed when the official response to their application was a warning that military service would be required of them; their sacral junction would have rendered it impossible for them both to have obeyed marching orders simultaneously (*N.Y. St. J. Med.*, 1937).

Previous Operations

Scammon (1925) recorded and described the operations performed for the separation of conjoined twins, including that performed by Doyen in 1902 for the separation of the Radica-Doodica sisters, one of whom had developed active tuberculosis: the tuberculous sister died, but the healthy survived. The earliest attempt at surgical separation is said to have been made by Dr. Farius, of Basle, in 1689, but I have not traced the record of this operation.

In October, 1912, conjoined twins were successfully separated at the Military Families Hospital, Portsmouth, by a R.A.M.C. officer whose name cannot now be traced. One of the sisters of this pair is alive to-day, age 41, and the scar of her operation can be seen on the lateral aspect of the hip. The other sister died of pneumonia at the age of 4 months, but there are no records to show whether or not she in fact had congenital heart disease. This would appear to be the first successful separation of conjoined twins.

Dr. Holm, of Minnesota, successfully separated conjoined twins joined by the xiphoid cartilage on January 8, 1927, and they were alive and well nine years later (Holm, 1936). Dr. D. W. McLaren (1936) also successfully separated conjoined twins of a Hausa woman in the Sokoto Emirate of Nigeria on June 16, 1935, and the separated twins are alive and well to-day (McLaren, 1953). Here again the junction was of skin, subcutaneous tissue, and cartilage at the level of the xiphoid process. Three further separations were recorded last year in America in the medical and lay press. In one of these (Carolyn Anne and Catherine Anne Mouton) the junction was pelvic and both girls survived, one with an artificial anus. The second example, in Cleveland, Ohio, was a separation of twins joined by cartilage at the xiphisternum, both again surviving (Reitman *et al.*, 1953), and the third (Grossman *et al.*, 1953) was a craniopagus, with a common sagittal sinus which necessitated the sacrifice of one child, the other surviving. In 1953 a craniopagus was born in Bonn, Germany, but operation was, I understand, refused. A xiphipagus born in Molenend in Friesland awaits operation. A thoracopagus born in Greenock, Scotland, on March 20, 1954, survived for rather more than a day, and conjoined twins born in Hamburg, Germany, on the same day, are still alive at the time of writing.

Hazards of Operation

Surgical success is most likely to be obtained when the union between conjoined twins is only of skin, subcutaneous tissue, and perhaps cartilage. I have recently been informed of several cases in which an umbilical junction of minor extent has been successfully separated just after birth and the event not thought worthy of medical record. The chance of success should also be high in twins joined at the xiphisternum by skin and cartilage only. Where a vital organ is shared—the liver or the brain—the division of that organ may render operation hazardous. The Edendale twins shared a common ileum (Tibbit, 1951). Pelvic junctions also offer particular difficulties, for frequently the generative organs, urethra, or rectum may be single (Fox and Barnes, 1950), or may be so closely associated with each other that surgical separation is extremely difficult. Sacral unions can be divided often only with sacrifice of one spinal cord at that level. Cranial unions may involve the division of brain substance (Smellie and Starr, 1950), or the loss to one infant of a blood vessel vital to the survival of its brain. In any event, and however great the risk of the death of one or both children, it would seem that operation should nearly always be undertaken if the children are known each to have a full complement of the organs and tissues necessary for separate life. In very extensive union there may be no prospect at all of separation, as in those historical monsters who lack a full complement of limbs, or who share a single pelvis or an even more extensive length of trunk.

In the case of a stillborn premature thoracopagus which I had an opportunity to dissect in February, 1954, by the courtesy of Dr. T. K. Owen, of Bournemouth, union was exceedingly complex. A bridge extended from just below the chin to the navel and the chest cavities and abdominal cavities were shared. Each foetus had a mouth, pharynx, and larynx, but there were a single oesophagus, stomach, duodenum, and small intestine down to the level of Meckel's diverticulum; here there was a dilatation from which the lower ileum passed to each foetus, and each foetus had a complete colon. There were only one heart and thoracic aorta, and one liver—a misshapen organ lying vertically in the middle of the bridge with only one common bile duct and portal vein, and with one pair of hepatic veins. The urinary tracts were normal and separate. There was a single trachea terminating in an arborization of bronchi which ended blindly, and the lungs were represented by multiple islands of solid tissue which had no communication with the bronchi. Such monsters could in no circumstances have survived to live separately.

The diagnosis of conjunction, usually made during labour, has only twice been made before labour has begun (Graber, 1945; Becker, 1950).

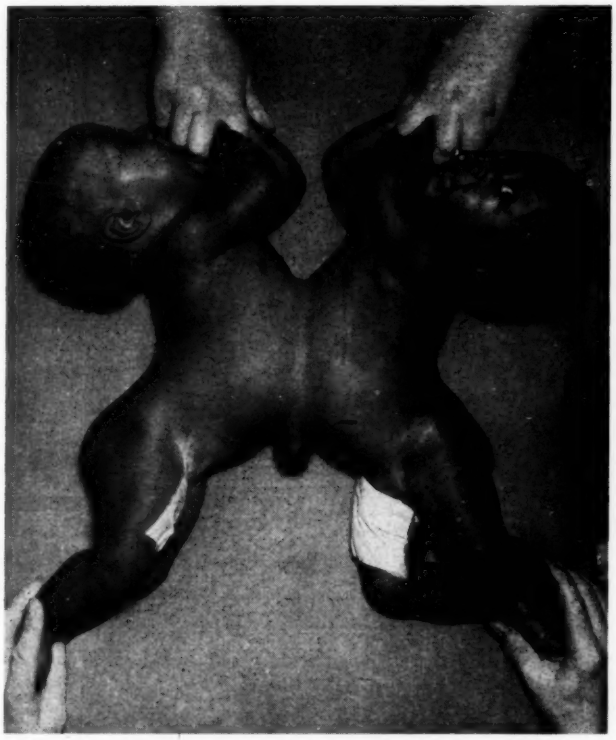


FIG. 1.—Photograph of conjoined twins showing hernia of common umbilicus. (Copyright reserved.)

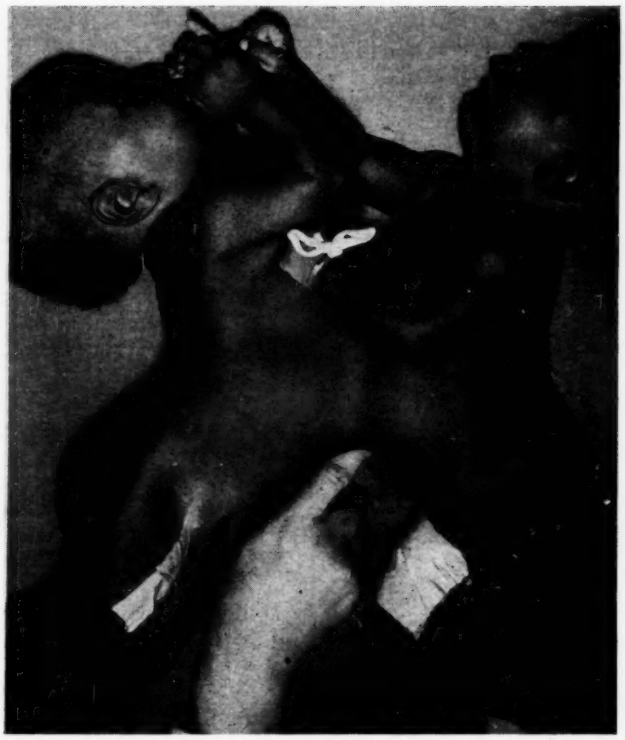


FIG. 2.—Investigating finger invaginating hernia into peritoneal cavity. (Copyright reserved.)

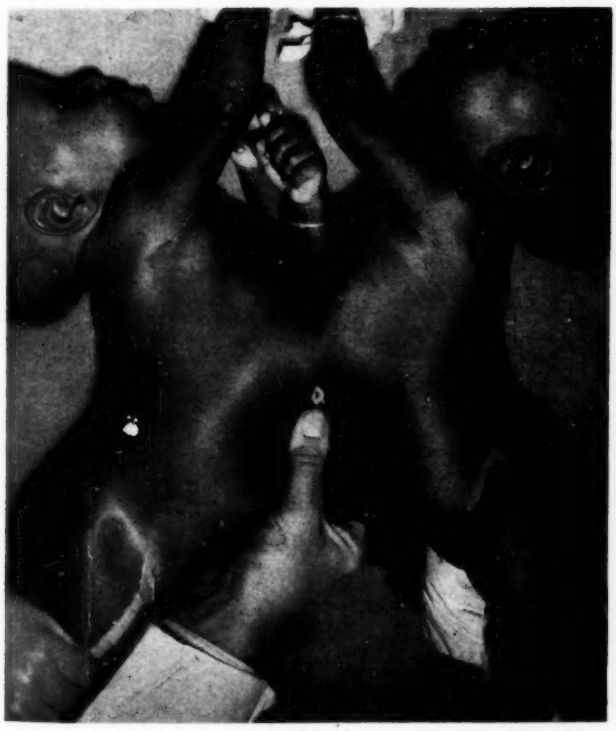


FIG. 3.—Lower part of "bridge" joining twins. (Copyright reserved.)

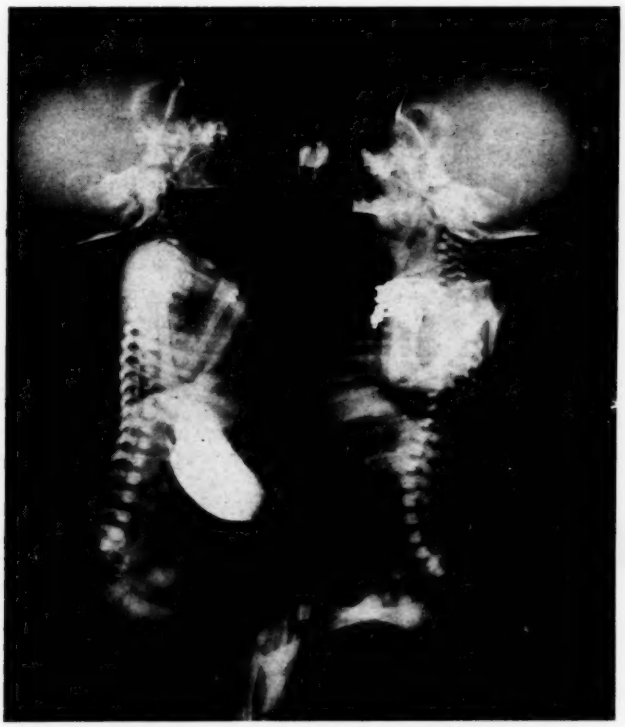


FIG. 4.—Barium meal filling stomach. (Copyright reserved.)

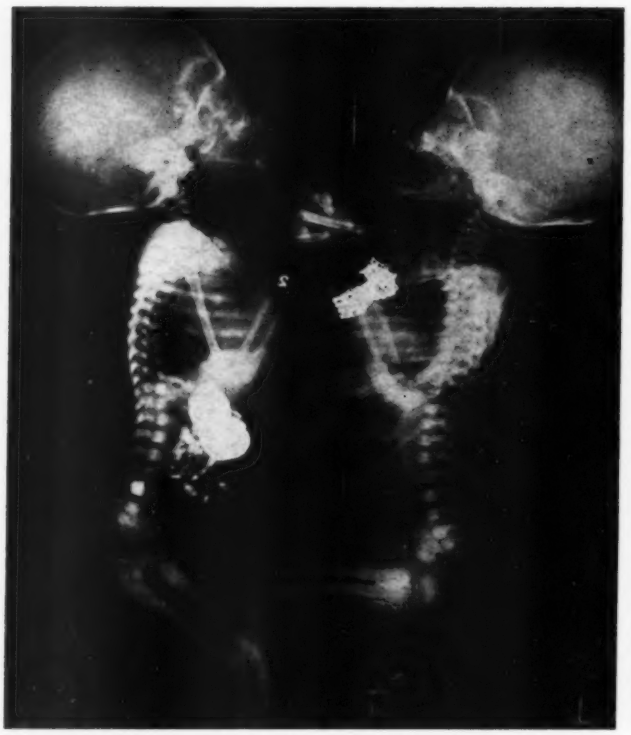


FIG. 5.—Barium meal showing small intestine. (Copyright reserved.)

FIG. 6.—Barium meal showing colon and rectum. (Copyright reserved.)

FIG. 7.—Photograph of surviving twin. (Copyright reserved.)

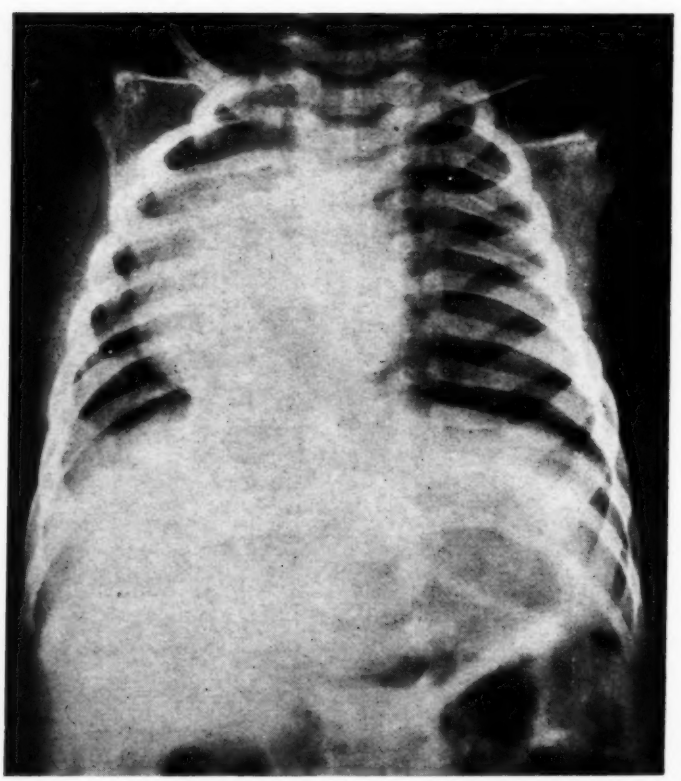


FIG. 8.—*X*-ray film of surviving twin showing dextro-rotation of the heart. (Copyright reserved.)

On March 22, 1954, a thoracopagus was born at Hastings, Sussex. The mother's previous obstetric history was of a miscarriage at 12 weeks gestation in 1947 and a full-time pregnancy in 1949. There was a history that the paternal grandmother had had three sets of normal twins. There was a pre-natal diagnosis of twins, both presenting by the head. Labour began at term on March 22. One head presented at the vulva next morning, but further progress was arrested and traction was in vain. The presenting baby died during these efforts to deliver it. The obstetrician (Mr. John F. Foulkes) was summoned, and his examination revealed the presence of conjoined twins. In view of their size delivery by the abdominal route was undertaken and accomplished, both babies being now dead. The mother has made a good recovery.

These twins were joined from the sternum at the level of the third costal cartilage to the umbilicus. The lower part of the communicating bridge took the form of a substantial exomphalos through the wall of which four umbilical veins, one pair on each aspect of the bridge, could be seen passing from a single placenta, diverging from each other on each aspect of the bridge and coursing together again, appearing to join at the edge of the exomphalos. Dissection of the specimen showed that each infant had an oesophagus and stomach, but that the two pyloric canals entered a single duodenum which was continued as a single small intestine to a point about half-way along the small intestine, where there was a pouch resembling a Meckel's diverticulum, though placed at a much higher level than usual; and from this pouch two separate enteric channels continued, one to each infant. The large intestines were normal. The liver was joined and no gall-bladders could be found. There appeared to be two sets of bile passages and each infant had a pancreas. A single heart, anatomically abnormal in a complex way, served both infants, and only one of the infants was possessed of an aorta. In the other infant no vessel or vessels suitable to take the place of the aorta could be found. These infants, though externally not substantially dissimilar to the conjoined twins of Kano, could not have been separated with any hope of the survival of both, and it seems unlikely that even one of them would have survived operative intervention. The complexity of their union shows the need for the most extensive possible investigation before the surgical separation of conjoined twins is attempted.

The Kano Twins

The conjoined twins which are the subject of the present paper were born in Kano, Nigeria, to a mother of Ibo race, on July 25, 1953. They were rotated at birth with respect to each other; one presented as a vertex, the other as a breech. A diagnosis of plural birth had not been made. The twins were successfully and safely delivered by a pupil midwife. Their weight at birth was 7 lb. 13 oz. (3.5 kg.) They were nursed at the breast, the mother learning to support them both in a suitable position for feeding together.

X-ray examination after the feeding of barium to one twin showed already while they were in Nigeria that the alimentary tracts were separate.

The twins were admitted to Hammersmith Hospital on Friday, November 13, 1953. Both were then in good health, and their joint weight was 19 lb. 1 oz. (8.7 kg.). One twin, Wariboko, was noticeably larger and more active than the other, Tomunotonye, and the facial appearance of each was quite distinct. They were not in the literal sense identical even though presumably uniovular.

The twins were joined by a bridge which extended from the sixth costal cartilage to the navel. The bridge was 14 cm. in its long vertical diameter and 37 cm. in circumference. There were a single common navel and an umbilical hernia which depended from the lowest part of the bridge (Fig. 1). This hernia could be invaginated, the invaginating finger passing easily into both peritoneal cavities (Fig. 2), which showed that the peritoneal cavities communicated at least in the lower part of the bridge. There was a firm ring of muscle around the neck of the hernia, which admitted two fingers, and it thus seemed certain that the bridge had a substantial muscle wall in its greater part. In its lower part the bridge could be compressed between finger and thumb (Fig. 3) so that its two walls met. In its uppermost part the bridge contained a hard tissue which was deduced to be cartilage: it seemed to arch over the upper part of the bridge formed by the fusion of the sixth, seventh, and eighth costal cartilages, and the lower part of the sternum. Even below palpable cartilage the bridge could not be fully compressed in its upper half.

A heart beat could be heard over the chest of each child, but it was impossible on auscultation to decide whether the beat was separate. The children breathed in unison and consequently sucked synchronously when fed. This was a matter at first of some apprehension, in case the diaphragms should be extensively intermingled and the pericardial cavities perhaps in communication with each other. It was then recalled, however, that animals artificially joined in parabiosis breathe synchronously, apparently as a matter of convenience, and it was hoped that synchronous breathing was a matter of convenience in these twins rather than a sign of seriously extensive anatomical union of their respiratory organs. It is perhaps of psychological interest that each infant sucked her own and her sister's thumb almost indiscriminately and with equal and mutual satisfaction.

A series of special investigations was undertaken to decide whether operative separation afforded any prospect of success.

X-ray Examination

A straight *x*-ray film failed to demonstrate visibly the cartilage bridge between sternums and ribs. (This feature can be seen in Figs. 4, 5, and 6.) Both spines were lordotic from the infants constantly straining away from each other, and the sternums both sloped forward towards each other from the upper to the lower ends. The heart shadows were clearly separate from each other. In repeated *x*-ray examinations the intestines filled the lower part of the bridge, but in none of the very numerous plates were hollow viscera seen to occupy the upper third of the bridge. In the very uppermost parts of the bridge a clear gap was observed between the two livers and the outlines of the opposing faces of the two livers were thought to be distinguishable; yet there remained a rather hazy shadow between these two outlines, and a bridge of liver tissue crossing from one infant to the other could not be excluded.

An opaque-meal examination was undertaken in Nigeria, barium being fed to one infant. This showed clearly that stomach (Fig. 4), small intestine (Fig. 5), and colon and rectum (Fig. 6) were separate for each child. It showed in addition that the pylorus of one child lay at least 3 in. (7.6 cm.) from the pylorus of the other, and therefore it was assumed that the two duodenums were substantially separate from each other, and consequently that at least the lower ends of the common ducts were separate too.

Cholecystography was next performed. The gall-bladders were both visible, well separate from each other. Consequently it was deduced that the common ducts must be separate at their upper ends and, since their lower ends were also considered above to be separate, presumably throughout their whole length. It was assumed that if the bile ducts were separate the portal veins would be separate also.

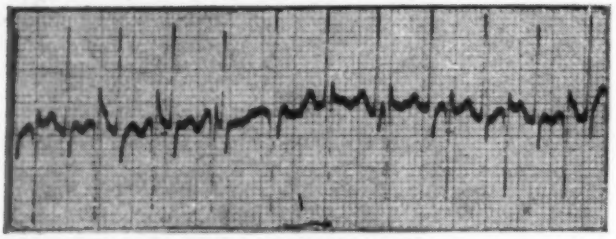
Intravenous pyelogram was performed at the same time as blood and circulation studies were done in order to preserve at least one great saphenous vein in each baby to be used for transfusion at the time of operation. An intravenous catheter was in each infant passed by way of the saphenous vein into the common iliac vein. A pyelogram showed that each infant had two kidneys placed well back in the paravertebral region. From this it was deduced that the renal arteries, and probably therefore the aortas, were in their

normal situations. Anomalies of the great vessels are frequent in conjoined twins and a common ventral aorta was to be feared. The pyelogram seemed to exclude this particular danger. The bladders were well outlined, separate from each other, and there was no visible junctional canal between them, as might be found by the union of one allantois with the other.

Electrocardiography

Electrocardiographic studies were undertaken by Dr. T. Counihan. They proved to be of special cardiological interest sufficient to require separate description, and Dr. Counihan's description of the electrocardiographic changes and discussion of their implications will be described in a separate paper. The individual electrocardiographs of both children were essentially normal. In the joint electrocardiograph (Fig. A) the Wariboko complex was inverted, and

Lead I W.D.



Lead I. RA/W—LA/T.

Lead I. T.D.

FIG. A.—Joint electrocardiograph. Wariboko complex inverted. Heart rates different.

this infant was shown later to have a dextro-rotation of the heart. This joint tracing showed clearly that the heart rates were different.

Investigation with Radio-isotopes

Mr. N. Veall, formerly of the Radiotherapy Unit, and Dr. P. L. Mollison, of the Transfusion Research Unit, of the Medical Research Council, both situated in Hammersmith Hospital, undertook a study of the circulatory connexion between the two infants. A known dose of radioactive red cells was injected by intravenous catheter into twin I. Gradually the injected cells, circulating across the bridge, mixed with the circulating blood of twin II. The concentration of radioactive blood in twin I consequently gradually fell, and the concentration of radioactive blood in twin II, as measured in successive specimens by Geiger–Müller counter, gradually rose, until equilibrium was reached with complete mixing. From the rate at which the proportion of radioactive cells in twin II increased the rate of blood flow across the bridge could be deduced. Mr. Veall prepared a graph (Fig. B) which showed the rise in radioactivity in the blood of infant II and the fall in that of infant I. The curve is, as was expected, an exponential one, but it will be seen that there is a slight time-lag in the early part of the curve. This would be compatible with the blood in the injected infant having to complete nearly the whole circle of the circulation, passing through not only pulmonary and systemic capillary beds but also the hepatic sinusoid bed before crossing the bridge. Mr. Veall's curve shows that complete mixing was obtained in 29 minutes, and half-mixing was reached in 5 minutes. The logarithmic curve and formula for determining the rate of crossing is given in Fig. C. It is thought desirable here to publish Mr. Veall's pre-operative report in full.

Consider two tanks A and B each having an equal volume V ml. They are connected together so that there is a flow of

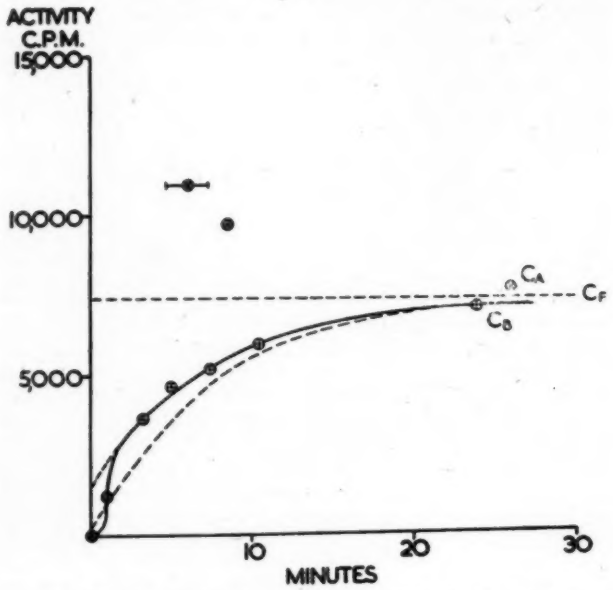


FIG. B.—Graph showing rise in radioactivity in blood of infant II and fall in infant I.

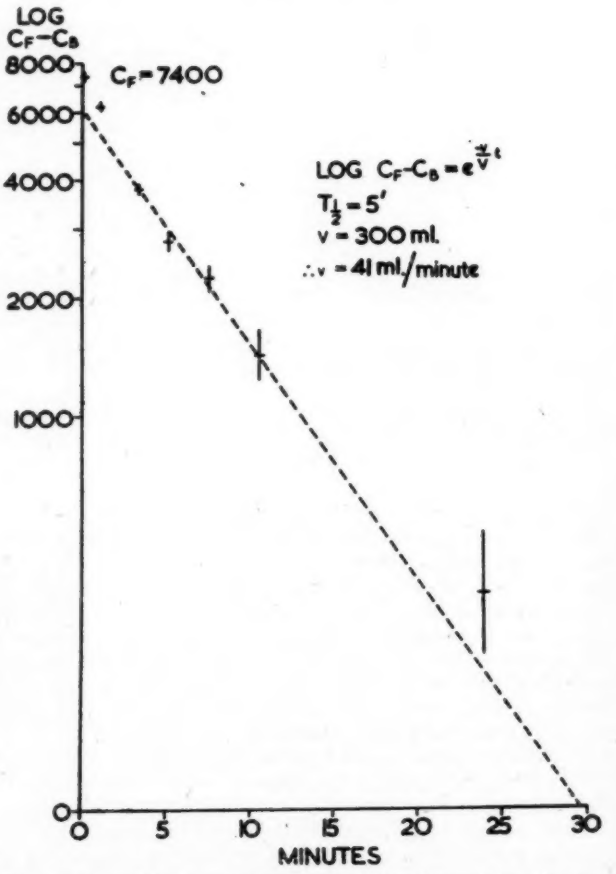


FIG. C.—Logarithmic curve and formula for determining the rate of crossing.

v ml./minute between them. A marker substance is added to tank A and its concentration C is measured in both tanks as a function of time. Assuming perfect mixing, the concentration of the marker in each tank is given by the equations:

$$(1)\ C_A = C_F(1 + e^{\frac{-v}{V}t});\ \text{and}\ (2)\ C_B = C_F(1 - e^{\frac{-v}{V}t})$$

where C_F is the final equilibrium concentration after mixing is complete. The two curves have the form shown in Fig. B, one being the mirror image of the other. By plotting the logarithms of either $(C_A - C_F)$ or $(C_F - C_B)$ against time a straight line is obtained (Fig. C), whose slope gives the value of the ratio v/V. Finally the volume V can be calculated from the value of C_F and a knowledge of the amount of marker added, so that the flow v can be calculated.

Two assumptions were made:

(1) That the blood volumes of the infants were equal: this assumption greatly simplifies the mathematical treatment and within the limits of the experimental data available appears to be reasonable.

(2) That there is perfect mixing: in the first two or three minutes this is certainly not true, so the very early points cannot be relied on for determining the slope of the logarithmic plot.

Injection of labelled red cells was made into infant I. Only two well-timed samples were obtained from that infant, and one sample which was uncertain because of catheter blockage. Six well-timed samples were obtained from infant II, and these gave a value for the ratio of v/V of about 1/7. The one-minute sample was ignored for this purpose (see assumption (2) above). A reliable value of C_F was obtained by means of samples from both infants when mixing was almost complete. This gave a combined blood volume, using the normal procedure and corrections, of 600 ml. for the thoracopagus, whence V (blood volume of each twin) equals 300 ml. Hence the blood flow, v, between the two infants is 40 ml. per minute in each direction. This figure is thought to be accurate to within $\pm 10\%$.

It will be seen that the actual points in figure B, except for the first and the last, do not fit the exponential curve which suits a half period of five minutes; the other points can be fitted by another exponential curve which extrapolates back to a value of 1,400 c.p.m. instead of zero. It is therefore necessary to account for a relatively sudden influx of labelled red cells, sufficient to increase the activity of the blood in infant II by about 1,400 c.p.m. and occurring at about one minute after injection.

A reasonable interpretation of this phenomenon would be as follows:

Assume that one-third of the cardiac output (blood volume) passes to the liver—that is, 100 ml. When the labelled red cells are injected no appreciable mixing will have occurred, and one-third of the labelled red cells will pass into the liver circulation of infant I as a wave. If 30 ml. of the liver flow then passes directly to the liver from infant II, and thence into the circulation, then the effective increase in concentration in infant II will be given by $14{,}800 \times \frac{1}{3} \times 0.3 = 1{,}500$ c.p.m.

This effect takes about one minute to manifest itself at the sampling point, a time consistent with the length of the circuit involved.

If the above assumption about liver flow is true a completely common liver circulation, with a common portal vein, would give about 50/50 partition. The implication of the figures obtained is that about 60% of the liver tissue is shared.

It thus emerged from the circulation studies that 41 ml. per minute of blood crossed the bridge in each direction. It was a guess that perhaps 5 to 10 ml. per minute might cross in the skin and muscle of the bridge. There was thus 30 to 35 ml. per minute to account for by a cross-circulation in some tissue other than skin and muscle. Assuming the liver circulation to be one-third of the total circulation it might be taken that 100 ml. per minute passed to each liver, or to each half of a shared liver. For 30 to 35 ml. to cross the bridge in each direction by way of the liver would mean that there was substantial mixing in the central 60% to 70% of a shared liver. The presumption that liver lay in the bridge was thus extremely strong.

Decision to Operate

The investigations seemed to show that both infants were fully equipped with all the organs necessary for separate life. It was not possible to predict whether the separate organs would necessarily function adequately after separation, but it was unfortunately not anticipated at this point that one of the pair might be contributing more, and one less, than the other to the total endocrine production. The only hazard of operation would seem to be the liver union which was confidently predicted; but this was not felt to be an insoluble barrier, though division of a common liver might well add to the shock of the operation. There was no previous record of the successful separation of twins so extensively conjoined. The investigations seemed to have shown that the portal veins and common bile bucts were separate. It was decided to operate without further loss of time to avoid increasing the spinal lordosis and the forward angling of the sternums.

The Operation

The mother was prepared for operation in case a vein or fascia graft or temporary skin cover by homograft should be required.

Instruments

Only two special instruments were included in our armamentarium, a liver tourniquet of fine soft rubber (Penrose) tubing, as used by Dr. Allin, of Edmonton, who lent his film of a previous separation, and Schumacher intestinal clamps for application to the liver bridge if it was narrow enough.

Anaesthesia

Since the vascular communication across the bridge gave complete mixing of the twins' blood only after 29 minutes it was obvious that both must be separately anaesthetized, and two anaesthetic teams were arranged. Nitrous oxide and oxygen anaesthesia was chosen, and each infant was to be separately intubated and to be anaesthetized by means of a separate anaesthetic apparatus.

For an operation of such magnitude on babies so young blood transfusion was obviously essential, and Dr. P. L. Mollison, Director of the Medical Research Council Transfusion Research Unit, catheterized the remaining saphenous veins so that transfusion would be entirely dependable.

The twins were placed on an operating table with the headpieces and footpieces dropped, and the double anaesthetic was induced without difficulty. A remarkable phenomenon was observed during the induction of anaesthesia. As has already been stated, the respiration of the twins before operation was synchronous. As the induction of anaesthesia proceeded, and while the children were breathing still voluntarily, each through its own anaesthetic apparatus, the character of the breathing changed, and a kind of see-saw respiration developed, one baby inspiring as the other exhaled. Gradually the tempo of respiration again changed, until each settled down at its own pace. The explanation of these respiratory changes must be exceedingly complex. Once induction was complete intubation proceeded and was effected without difficulty.

Towelling the Twins

The special arrangements for towelling were learnt also from the Canadian film. A team of nurses supported the twins horizontally over the operating table and well clear of it, while the skin of the whole trunk of each, and of the bridge between them, was cleaned. A series of four towels were then applied to the babies, one towel wrapping the head and upper chest of each, and the others the lower extremities. The towelled babies were then placed on the operation table. Two surgical teams were in readiness, each consisting of surgeon, assistant, and instrument nurses, the two surgeons to separate the twins and then each to conduct one closure. Other specialists were additionally available to advise in the solution of unexpected problems in particular fields, and an anatomist to help unravel internal anatomi-

cal abnormalities, especially the complicated and varied venous plexuses sometimes present in such twins on the under surface of the liver.

INITIAL PHASES

It was decided first to explore the bridge directly through its presenting obverse surface, the incision being made initially from the cartilage bridge to the navel. The alternative would have been to start at the lower limit of the bridge, dividing the parietes on both obverse and reverse aspects, and closing the two abdomens from below upwards *pari passu* with the division. This might have been less shocking, but would have been clumsy and slow, and control of escaping viscera might have been awkward. The anterior approach to the abdominal cavity and to the liver, leaving the parietes on the far side undivided until the end of the operation, would, it was thought, permit the intestines to be easily packed off throughout the whole period of operation. The number of hands in the operation field was restricted to four, which ought to be sufficient for control of the abdominal contents and for retraction. A multiplicity of hands is a hindrance in the neighbourhood of so small a wound.

The skin having been divided, a reasonably thick sheet of abdominal muscle presented, equal to the whole thickness of the normal infantile abdominal wall, though not separated in layers. When this was divided, peritoneum appeared in the lower part of the wound and the liver bridge could be detected in the upper part. A cushion pad of suitable size inserted under the bridge was now found to enhance the exposure substantially.

Since it was known that there was a common peritoneal cavity, extending at least across the lower part of the bridge, where the hernia could be invaginated, the peritoneal cavity was first opened here. It was now clear that the peritoneal cavities communicated only at the lowest extremity of the bridge in the neighbourhood of the hernia. The peritoneal incision had in fact entered the peritoneal cavity of baby I. It was extended now up as far as the liver, and it was clear that the peritoneal cavities communicated freely below, but above were separated by a slender dividing veil which stretched across the whole thickness of the bridge. The peritoneal cavity of baby II was now opened in the same way.

The intestines were now packed off carefully, the packs being inserted along the surface of the peritoneal partition to reach the abdominal wall on the far side of the bridge. The nature of the peritoneal partition was now clear. Above, it was attached to the liver; and inferiorly it had a crescentic edge concave downwards. Its attachment to the near and far walls of the bridge extended down to the navel, and to its surfaces were attached the falciform ligaments. The upper part of this partition, just below its attachment to the liver, was now divided, together with the falciform ligaments. There was the expected plexus of veins in relation to the under surface of the liver and the falciform ligaments, but this gave less trouble than was expected. Care was nevertheless taken to clamp carefully the peritoneal folds of the liver before their division.

THE LIVER

It was now clear that the central part of the common liver could not be satisfactorily exposed for division until the bridge of cartilage which crossed from one chest wall to the other had been at least partly divided. It proved to take the form literally of a bridge or arch, being concave downwards in the coronal plane and forming a cartilage roof over the upper part of the common liver. It cut easily with the knife, but was really so rigid that it was surprising to recollect that the babies had been twisted through 90 degrees at birth. After the bridge had been divided to a point beyond its summit, the remaining cartilage on the far side yielded sufficiently for a much better view of the liver to be obtained. Care was taken not to distract the two infants from each other. It was felt that stretching of the liver after the loss of its cartilage protection might exert dangerous traction on the hepatic veins and on the diaphragm. The division of the cartilage did, however, give a much wider view of the presenting surface and of the inferior surface of the common liver, and the two gall-bladders could be demonstrated in the situations where cholecystography had shown them to lie. Obviously the next stage of the operation must be division of the liver through its centre in the bridge. No obstruction was met to a finger passed round the bridge to reach the lower edge of the liver on the far side.

At this stage of the operation it soon became clear to us how valuable was the method of liver control devised in Edmonton at the operation on the Townsend twins. In passing the forceps which would later guide the tourniquets round the liver bridge it was clearly desirable to keep as far as possible, on each side, from the centre of the liver. If the tourniquets lay too close together on the far side of the bridge they might easily slip through the cleft in the divided liver when liver division was completed. Consequently each artery forceps was induced to find its own separate way round the far side of the liver as far as possible from the median plane of the bridge. Each Penrose rubber drainage tube followed easily the path of its guiding forceps, and the tension made by this tubing when finally controlled by clip was very comfortable. It was estimated that the tourniquets lay 5 or 6 cm. from each other on the far side of the liver, and that there would not be much danger of their slipping when liver division was completed. It was found more convenient to divide the liver by knife and scissors than to tear through it with forceps, though the consistency of the liver varied from place to place: in one place it would be easy to tear through soft liver substances, while in another it was necessary to use sharp dissection.

When liver division had proceeded through approximately three-quarters of the bridge a thin band of liver tissue remained on the far side, and it proved easy to apply a Schumacher clamp and to divide the remaining liver between the clamps: though a variety of clamps were in readiness, this particular type was, as had been expected, the most suitable for the purpose. By rotation of the clamps towards the operator the raw surface of the liver of baby I could now be inspected. It was easy to distinguish open blood vessels and bile ducts, and these sustained the application of artery forceps surprisingly strongly without tearing. Indeed the impression was obtained that the divided vessels on the cut surface of the liver of this baby were easier to control than are those of the adult liver.

It had been intended to trim the cut surface of the liver to a concave shape so that its edges could be sutured together by stitches through Glisson's capsule, and the liver surface was inspected while consideration was given to this step. It was felt highly desirable to close the raw surface in this way lest bleeding should occur with the increase in liver flow which follows operation, and to avoid the oozing of bile into the peritoneal cavity, so commonly followed in babies by subphrenic abscess. In fact the question did not arise, for the liver tissue proved to be so flexible and elastic that the cut edge of Glisson's capsule on the far side of the raw surface could be brought quite readily forwards for suture. After division of the liver the abdominal contents had to be packed off again on each side to afford a view of the undivided peritoneum on the far side of the bridge. Division of the remaining cartilage link was now completed, and the soft tissues on the far side of the bridge were divided from within outwards.

CLOSING THE ABDOMINAL WALL

In closure of the abdominal wall a single layer of stitches was employed for muscle and peritoneum. In the upper part of the closed abdominal wound the heart could be seen beating through the opening in the diaphragm, where diaphragmatic muscle had presumably been united across

the bridge under cover of the cartilage roof. That part of the cartilage bridge which now appertained to each child protruded in an unsightly way and had to be trimmed, but care was taken in trimming not to leave too much of the pericardial sac exposed. The procedure was now identical for the two children at the two separate tables except in so far as the liver of baby II had still to be sewn over after the moment of separation. The last stage in closure was to trim the skin over the hernia that had been present in the lower part of the bridge, and to excise on each side what remained of the hernial sac. The quality of the muscle in both babies was rather poor at this level, and the muscle closure at the lower end of the wound, though complete, gave rise to some doubt of its strength.

As separation approached completion the second team came into play. This proved to be really quite a complicated manœuvre. Its abdominal contents kept in place by packs and manual pressure, the baby, complete with transfusion apparatus, had to be carried to the second table, the anaesthetist moving over with his apparatus too. The manœuvre was completed without mishap.

It might be said at this point that all pre-operative predictions were, as has been seen, fulfilled as the operation proceeded, and the plan of the operation proved reasonably sound. There was, however, one fault in the planning which should be considered when this operation is repeated—the difficulty of an accurate swab count at the end of the operation which starts as a single operation and finishes as two operations performed by two separate teams. This did not occur either to the surgical or to the nursing planners until the time came to count the swabs at the end of the operation, when for a few minutes it proved extremely difficult to establish that no swab was missing.

The abdomen of the second baby was now closed, and the total operating time from the first incision to the insertion of the last stitch in the second baby was one hour and thirty-five minutes.

Thus at the end of the operation two apparently normal and separate babies were obtained. Their general condition was good, and the circulation of each was entirely satisfactory. The babies were in as good shape as any babies of that age are after an abdominal operation. The babies were returned from theatre to ward in a double oxygenaire specially constructed by the Oxygenaire Company to contain both. On their return to the premature baby unit, still in good shape, they were transferred to separate oxygenaires.

Collapse of Tomo

One hour after their return, while still under close inspection, Tomo suddenly collapsed. The chest was opened and the heart massaged for an hour. A ventricular rhythm returned but no normal beat. Post-mortem examination showed no cause for death. There had been no bleeding and the liver closure was perfect. There was no cardiac or other abnormality. The lungs were airless and oedematous, as is usually observed *post mortem* after artificial respiration with oxygen through tracheal tube and cardiac massage. The only possible cause of death lay in the adrenal gland. This was only about one-third of its normal weight as measured by the adrenal/renal weight ratio. It is possible that the surviving twin had been responsible in life for the greater part of the production of cortisone for the pair, and that the dead twin had insufficient adrenal-cortical tissue to withstand the shock of the operation. When this operation is done again it would be wise to give both twins cortisone, for usually in such a partnership one twin is dominant, providing more for, and taking more from, the joint organism. It is notable that after Holm's successful separation of twins conjoined only by skin, muscle, and cartilage one infant was noticed to be particularly pale and collapsed.

The Surviving Twin

The surviving baby's wound was well healed on the tenth day of her post-operative course (Fig. 7), and it gave rise to no anxiety whatever. There remained a weakness of the lower end of the wound, and this baby has the umbilical hernia which is exceeding common among Nigerian babies. There is a protuberance also where the cartilage bridge was divided, and this is to some extent due to the rather acutely sloping sternum, the children when joined having striven always to pull away from each other, a fact which led to distraction of the xiphisternum on each side forward in front of the upper part of that bone. *X*-ray examination of the surviving baby (Fig. 8) shows now dextro-rotation of the heart. But the electrocardiogram was not that of a situs inversus; there was therefore no true mirror-imaging of the twins present. The surviving baby and her mother left hospital to return to Nigeria on December 21, eighteen days after operation.

ACKNOWLEDGMENTS

I must express my gratitude to Dr. A. O. Sasegbon, of Kano Hospital, for offering us this rare surgical problem, and for the excellent clinical notes which he furnished of the birth and early life of the twins in Nigeria. I must also pay public tribute to Dr. Eardley S. Allin, of Edmonton, for sending us his film of the operation on the Townsend twins; we learnt much from it.

I am indebted to many colleagues for assistance with the management of these twins. Professor Alan Moncrieff supervised the paediatric problem they presented in his Premature Baby Unit at Hammersmith Hospital. Dr. R. Steiner was responsible for the radiographic detail. The anaesthetic arrangements were supervised by Dr. H. Woodfield-Davies, with the assistance of Dr. A. Ryan. Dr. T. Counihan undertook the electrocardiographic studies. For the precise prediction of the size of the liver bridge we are indebted to the radio-isotope work of Mr. N. Veall, formerly of the Medical Research Council Radiotherapeutic Unit at Hammersmith Hospital. All the intravenous work before and during the operation was undertaken by Dr. P. L. Mollison, of the Medical Research Council Blood Transfusion Research Unit at Hammersmith Hospital; Dr. Mollison's previous experience of infant transfusion made his services invaluable on this occasion. Mr. Selwyn Taylor co-operated with me in the operation on the babies and was responsible for the closure of one of them. Professor W. J. Hamilton, Professor of Anatomy at the Charing Cross Hospital Medical School, advised us on the vascular anatomy to be expected in the bridge, assuming a common liver. I am grateful to Dr. I. Doniach for his report on the post-mortem findings in the case of the twin who died.

The return journey Kano–London–Kano of baby and mother, together with nurse, was defrayed by the United Africa Company. The cost of their treatment as private patients in Hammersmith Hospital was borne by an anonymous donor.

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TREATMENT OF PERNICIOUS ANAEMIA WITH VERY SMALL QUANTITIES OF PYLORIC MUCOSA AND VITAMIN B_{12}

BY

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Recently I described investigations into the localization of the anti-anaemic factor ("intrinsic factor") in the pig's stomach (Meulengracht, 1952a, 1952b). It was shown that even minute amounts of the pyloric mucosa of the pig's stomach can be therapeutically active when combined with one or other source of the "extrinsic factor" under suitable conditions regarding preparation and blending.

In the present work this advance, which arose from a fortuitous discovery, has been pursued further, and it has been proved that an apparently full therapeutic effect can be obtained with doses of the intrinsic factor far smaller than had hitherto been imagined, when these are suitably combined with vitamin B_{12}.

Technique

The source of the intrinsic factor used was the dried mucosa of the pyloric region of the pig's stomach prepared as previously described (Meulengracht, 1952a, 1952b). The vitamin B_{12} used was an ordinary commercial product, controlled spectrographically.

Patients suffering from untreated pernicious anaemia were used in the investigation. The reticulocytes were counted daily in wet preparations. The reticulocyte maxima for the different forms of dosage were plotted against the number of erythrocytes at the beginning of treatment, for comparison with Bethell and Goldhamer's (1933) standard for the expected reticulocyte maxima after adequate intravenous and oral treatment with liver extract.

The erythrocytes were counted at weekly intervals. The rises during the first three weeks for the different forms of dosage were plotted against the number of erythrocytes at the beginning of treatment, for comparison with Schiødt's (1939) standard for the expected erythrocyte rises after adequate oral treatment with liver extract, "ventriculin," and (in accordance with my own experiences) "pylorin." Schiødt's standard was recalculated for 21 days.

Experiments With Very Small Doses of Pyloric Mucosa Administered Alone

Some orientating experiments were first made with very small amounts of pyloric mucosa given alone in the form of weighed powder. Preliminary tests showed that such doses were not entirely inactive, at any rate when given in close association with meals, which, in fact, on the ordinary mixed diet, must contain requisite amounts of the food factor.

Twelve experiments were made. In nine the dose of pyloric mucosa was 0.1 g. of dried substance thrice daily, and in three it was 0.2 g. thrice daily. In some of the experiments the administration was at meal-times—that is, at 9 a.m., 1 p.m., and 6 p.m.—in other experiments it was between meals, at 8 a.m., 11 a.m., and 9 p.m.

The following results were obtained. In one isolated case there was no demonstrable effect. In the majority there was some response, but it was not complete, since only a weak and protracted reticulocyte reaction occurred without a full rise in the haemoglobin and red cells, and with subsequent secondary reactions after adequate injection treatment with liver extract or vitamin B_{12}. Lastly, in two or three experiments there was a more pronounced effect.

The experiments showed practically no difference between the two dosages. Nor is it possible to decide definitely whether administration at meal-times or between meals played any part, although the effect seemed to be more pronounced when the pyloric mucosa was given at meal-times. It is possible that a rather more suitable planning of the experiments might produce clearer evidence on this point; thus it might be arranged that, in the case of the dosage between meals, the stomach and the upper part of the intestinal canal should be empty at the time of the administration—for example, by resorting to nightly administration. The importance of the times of oral intake of the intrinsic factor in relation to meals has never been properly grasped. An attempt was therefore made to elucidate this point, but, as intimated, the technique of the experiment was scarcely satisfactory for this purpose.

TABLE I.—*Reticulocyte Maximum and Erythrocyte Rise in 12 Patients After Oral Administration of Small Amounts of Pyloric Mucosa Alone*

No.	Pyloric Mucosa Orally	Reticulocyte Maximum	Three Weeks' Erythrocyte Rise
180	0·1 g. × 3	4·6%	0·65
181	0·1 g. × 3	5·4%	−0·10 (14 days)
184	0·2 g. × 3	7·8%	0·60
186	0·1 g. × 3	10·8%	0·80
192	0·1 g. × 3	13·3%	0·40 (14 „)
194	0·1 g. × 3	7·8%	0·35 (14 „)
196	0·1 g. × 3	5·2%	−0·30
197	0·1 g. × 3	4·6%	0·80
200	0·1 g. × 3	1·8%	−0·10* (14 „)
1	0·2 g. × 3	16·8%	1·15*
3	0·2 g. × 3	21·0%	0·60
5	0·1 g. × 3	10·6%	0·20 (14 „)

*Blood transfusion.

The results of these orientating experiments with very small doses of pyloric mucosa given by itself are shown in Table I and Fig. 1. Both the reticulocyte maxima and the three-weeks erythrocyte rises after adequate oral administration are far below the expected increases in each case.

Experiments With Very Small Doses of Pyloric Mucosa and Vitamin B_{12}

In this series of experiments the same very small amounts of pyloric mucosa were combined with vitamin B_{12} in the proportion of 0.1 g. of dried pyloric mucosa and 5 μg. of vitamin B_{12} in weighed powder.

There were 10 experiments in all. In the first three the mixture was given three times daily, the daily dose being 0.3 g. of dried pyloric mucosa and 15 μg. of vitamin B_{12}. In the following experiment the combination was given twice daily, the dose then amounting to 0.2 g. and 10 μg. respectively. In the rest of the experiments the compound was given only once a day, so the daily dose was narrowed down to 0.10 g. and 5 μg. respectively. It will be seen from Table II and Fig. 2 that the reticulocyte maxima and the three-weeks erythrocyte rises are now greater and approach the standards for adequate oral treatment in spite of the dosage in most of the cases being restricted to 0.1 g. of dried pyloric mucosa and 5 μg. of vitamin B_{12}.

In two of the experiments the erythrocyte rise is clearly unsatisfactory. Both of these experiments fall into the group in which the dose was reduced most drastically.

Preliminary Experiments with a Commercially Prepared Substance, "Cycoplex Mco"

Our knowledge was now so far advanced that it was decided to adopt the method in the routine treatment of pernicious anaemia.

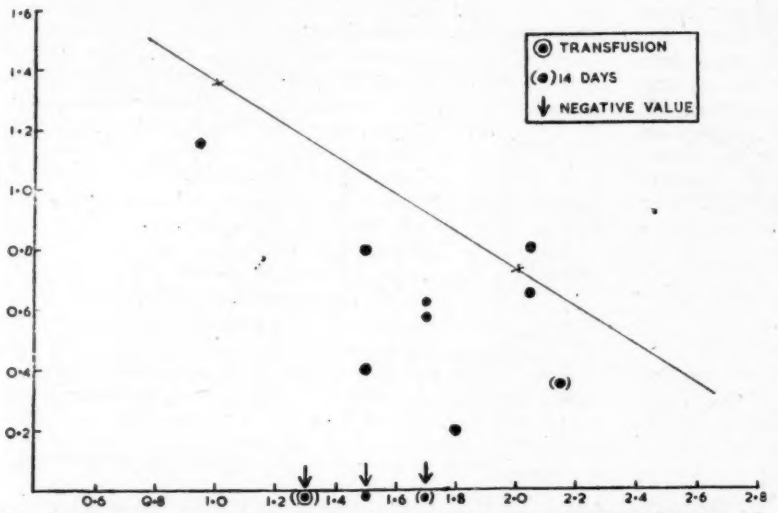

FIG. 1.—Three weeks' erythrocyte rises in 12 patients after oral administration of small amounts of pyloric mucosa alone in comparison with Schiødt's standard.

When it is remembered that at the time the treatment with dried stomach was first introduced large amounts were administered, it must seem surprising, indeed almost sensational, that such small doses as those used in the above experiments can be effective.

For the earlier preparations the following scheme of dosage was usually recommended in the treatment of fresh cases :

Ventriculin	20 g. thrice daily
Pylorin	10 g. „ „
Exo-pylorin	5 g. „ „

In view of the experiments described above, it would seem that we ought to be able to come right down to centigram doses, provided that the material is taken from a site in the pig's stomach where the intrinsic factor occurs in a concentrated form—that is, the pyloric mucosa (Meulengracht, 1934 ; Meulengracht and Søeborg-Ohlsen, 1934).

As has so often happened on previous occasions, it became apparent that, when one proceeded to the commercial production of a preparation various obstacles of a technical nature had to be overcome if uniformity and stability were to be guaranteed.

In the commercial preparation the mixture of dried pyloric mucosa and vitamin B_{12} was put into small gelatin capsules. Each capsule contains 0.05 g. of dried pyloric mucosa and 5 μg. of vitamin B_{12}. The vitamin B_{12} content is thus greater than that in the above-described orientating experiments. The preparation has received the name "cycloplex mco."*

Therapeutic experiments with this commercial preparation have been carried out in my hospital department and, at the manufacturer's request, in the medical departments of a number of other hospitals in this country. The dosage has been three capsules daily, corresponding to a daily dose of 0.10 g. of dried pyloric mucosa and 15 μg. of vitamin B_{12}. The four curves from my department are reproduced in Figs. 3, 4, 5, and 6, in which the reticulocyte reaction and the rises in Hb and red cells are recorded. The total number of experiments—both my own and those from the various other medical departments—are recorded, with the permission of the manufacturers, by graphic presentation of three-weeks erythrocyte rises (Fig. 7).

In my four experiments subjective recovery, rapidly ensuing reticulocyte reaction with a high narrow form of curve, and a big rise in the number of erythrocytes were observed. When one is used to judging the reactions in different kinds of treatment, the rapidity and abruptness with which they set in become striking. The three-weeks erythrocyte rises for all the cases, which are plotted in Fig. 7 in comparison with Schiødt's standard, display an even distribution around the latter.

*Cycobemin (*Pharmacopoeia danica*) = vitamin B_{12}.

Commentary

Combined preparations—that is, preparations in which an attempt has been made to combine the intrinsic and extrinsic factors in a suitable manner—are nothing new in the treatment of pernicious anaemia. The most commonly used preparation in Denmark, exo-pylorin, is just such a combination : each 5-g. carton contains 3.5 g. of dried and pulverized pig's total pylorus and 1.5 g. of "liver remains" as the sources of the intrinsic and extrinsic factors respectively (Meulengracht, 1941).

TABLE II.—*Reticulocyte Maximum and Erythrocyte Rise in 10 Patients After Oral Administration of Small Amounts of Pyloric Mucosa + Vitamin B_{12}*

No.	Pyloric Mucosa + Vitamin B_{12} Orally	Reticulocyte Maximum	Three Weeks' Erythrocyte Rise (Millions)
8	0·1 g. + 5 μg. × 3	15·2%	1·25
10	0·1 g. + 5 μg. × 3	24·6%	1·20
12	0·1 g. + 5 μg. × 3	15·4%	1·15
38†	0·1 g. + 5 μg. × 2	10·0%	1·80* (17 days)
14‡	0·1 g. + 5 μg. × 1	42·4%	1·50
16	0·1 g. + 5 μg. × 1	19·0%	1·35
18	0·1 g. + 5 μg. × 1	12·6%	0·75
19	0·1 g. + 5 μg × 1	9·2%	0·05 (16 days)
28	0·1 g. + 5 μg. × 1	10·4%	1·25
30‡	0·1 g. + 5 μg. × 1	18·0%	0·50

* Blood transfusion.
† Complicated by fracture of the neck of the femur.
‡ Complicated by fever (pyuria, phlebitis).

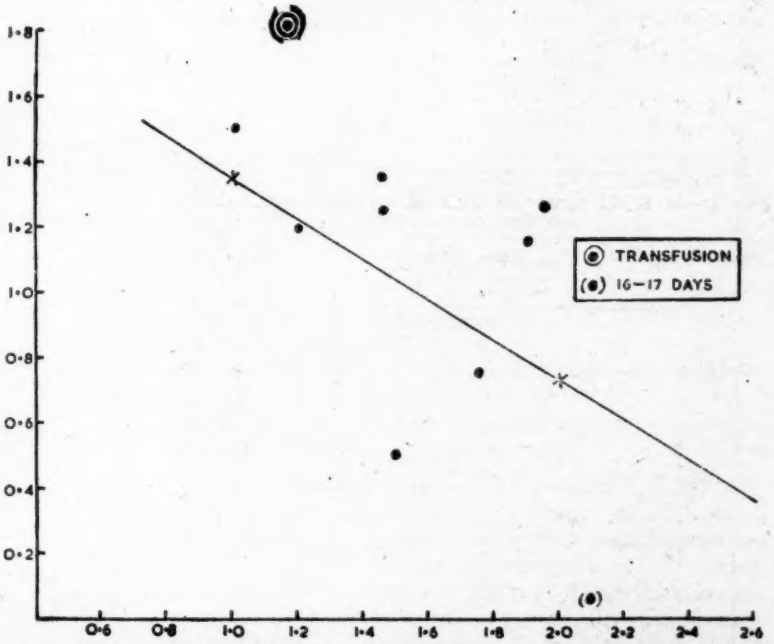

FIG. 2.—Three weeks' erythrocyte rises in 10 patients after oral administration of small amounts of pyloric mucosa and vitamin B_{12} in comparison with Schiødt's standard calculated for 21 days.

The bringing to light or, indeed, identification of the two factors which has gradually taken place, particularly the generally accepted identification of the extrinsic factor with vitamin B_{12}, has led to the production of combined preparations from concentrated sources of the two factors. In practice this means a concentrate of the intrinsic factor from the pyloric portion of the pig's stomach, where this factor, according to earlier experiments, is principally localized (Meulengracht, 1934; Meulengracht and Søeborg-Ohlsen, 1934), and the pure crystalline vitamin B_{12} which is now easily procurable commercially.

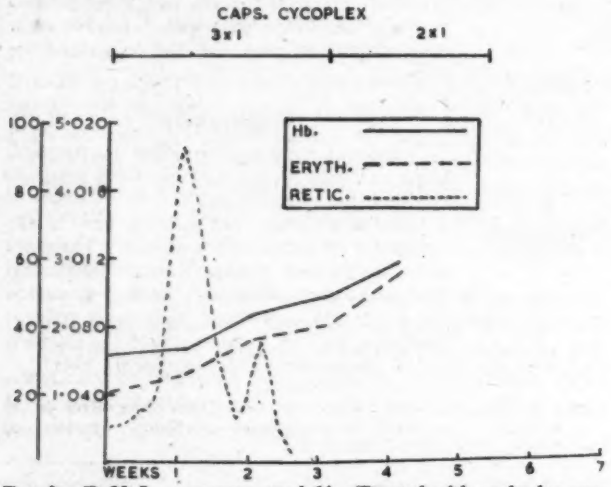

FIG. 3.—E. V. L., a woman aged 64. Treated with cycloplex mco three capsules daily. Bispebjerg Hospital, Dept. B.

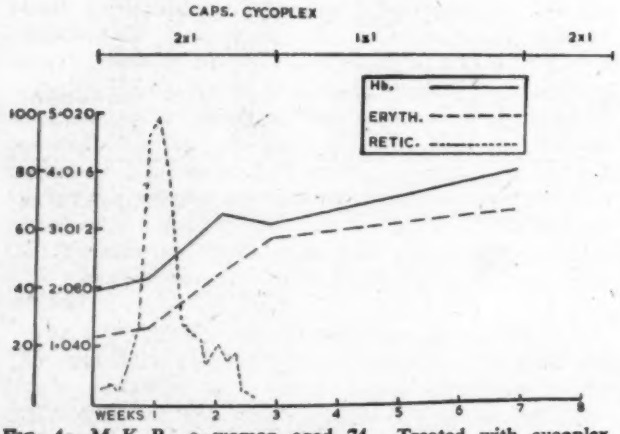

FIG. 4.—M. K. B., a woman aged 74. Treated with cycoplex mco three capsules daily.

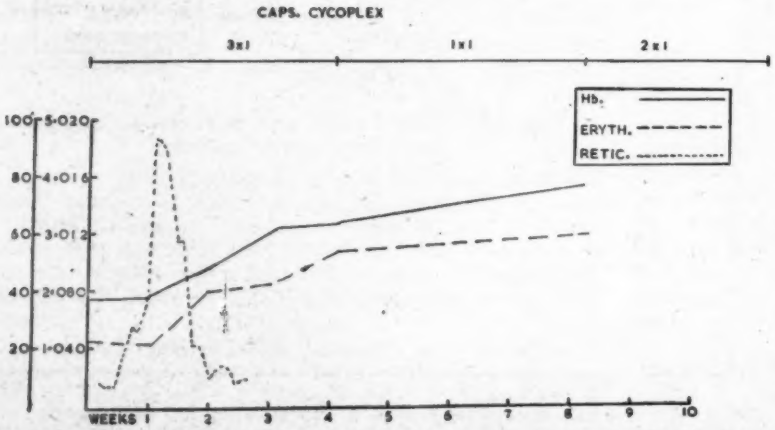

FIG. 5.—M. B., a woman aged 53. Treated with cycoplex mco three capsules daily.

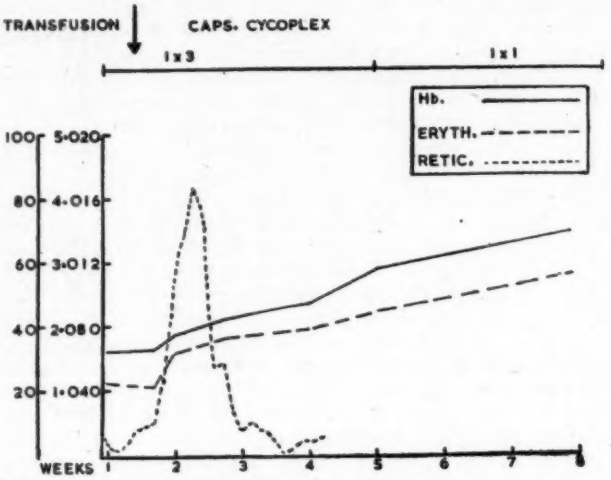

FIG. 6.—H. N. J., a woman aged 53. Treated with cycloplex mco three capsules daily.

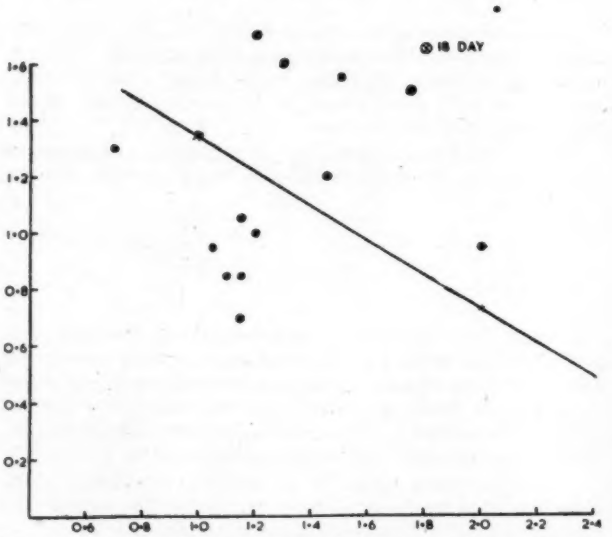

FIG. 7.—Three weeks' erythrocyte rises in 16 patients after oral administration of cycloplex mco three capsules daily in comparison with Schiødt's standard.

Such combined preparations suggest themselves, and indeed they have recently been put on the market in different ways in a series of preparations in some countries, including Denmark (Hoff-Jørgensen *et al.*, 1952). As the source of the intrinsic factor in these preparations extracts of stomach have been used, by which means a reduction in weight can be arrived at, although rather complicated technical procedures and the probability of waste are involved. Much more simply, however, with regard to both preparation technique and accuracy, can one resort to very small—in fact, in relation to previous dosage, minimal—amounts of pyloric mucosa for the source of the intrinsic factor, as demonstrated in the investigations above. One is thereby spared an elaborate and incalculable technical process, and can be content with a statement of the weight of the substance of the organ dried at a low temperature; while, as regards the testing of the activity of the preparation and the determination of the dose, one can keep to the approved methods, using fresh cases of pernicious anaemia.

It seems as if extremely small doses are usually adequate. Profiting by earlier painful experiences (Meulengracht, 1933) —there an attempt was made to cut down the dose and to individualize it—it was felt to be more rational that the dose should be fixed in excess of what is absolutely needed, so that each patient might be covered and protected against unpleasant surprises in the form of incomplete compensation of the anaemia or a myelopathy attack.

Since the economic factor is less important than hitherto, I would recommend, as a result of the experiences here recorded, that the initial dose in fresh cases be fixed at two capsules three times daily, but the maintenance dose has yet to be fixed by further experiments.

With regard to the plan of dosage, I have endeavoured to give these between meals in order not to mix up the small quantities involved with a large meal; but whether this is reasonable and appropriate I honestly do not know, for there is no evidence in favour of this procedure, and I cannot conclude anything definite from my own experiments.

Summary

It has been shown that even very small doses of dried pyloric mucosa from the pig's stomach given alone exert a definite but, in comparison with Bethell and Goldhamer's and Schiødt's standards, slight anti-anaemic effect.

It has also been demonstrated that the same very small amounts of pyloric mucosa, when combined with vitamin B_{12} in quantities which in themselves are inactive when given orally, exert a strong anti-anaemic effect which is practically the same as the standards referred to.

A commercial preparation, cycoplex mco, in daily dosage of 0.15 g. of dried pyloric mucosa and 15 μg. of vitamin B_{12}, exerts a strong anti-anaemic effect which corresponds to the standards cited. In the routine treatment of pernicious anaemia patients, in order to be well on the safe side, a dosage is recommended which corresponds to 0.3 g. of dried pyloric mucosa and 30 μg. of vitamin B_{12} for the initial doses. The maintenance dose has yet to be fixed.

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The "Odlum Fund," recently set up by the National Association for Mental Health through the generosity of Dr. Doris Odlum and others, is to be used as a permanent fund for the production of pamphlets by the association. The fund, which amounts to about £1,000, will enable the association to consider the possibility of publications without reference to its general finances. In its annual report for 1952–3 the association states that its financial position, extremely serious at the beginning of the year, has now greatly improved. The report gives a short account of considerable and varied activities. An inquiry into the necessity for a change in the law for dealing with aggressive psychopaths has reached the stage where discussions with the Home Office are imminent. In the case-work department the number of advisory cases referred during the year was 1,650.

DOMICILIARY OBSTETRICS*

A SURVEY AND COMMENTARY

BY

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Domiciliary midwifery is gradually diminishing in spite of the ample evidence that good results are compatible with a high proportion of domiciliary deliveries. Delivery in hospital is no panacea, and is expensive. It may be that for the same expenditure better results can be obtained by improving the domiciliary services than by expanding maternity hospitals, for the former make greater use of the patient's own resources; but it is difficult to say how improvements could be made, or how cases should be selected for hospital delivery, for the literature relating to domiciliary work is very small.

This survey is a superficial study of 4,441 births, with the primary object of collecting information on which can be based the selection of cases for hospital delivery so that the remainder will consist of those who can be delivered at home in reasonable, if not absolute, safety. It is also intended to indicate the type of obstetrical problem likely to be met in general practice, and to show whether maternity cases may safely be supervised by a practitioner who has consultant support but no post-graduate experience.

Material

The patients of a general practitioner with a list of 2,500 (rather more than average) will produce only about 40 babies a year. Approximately half will be born in hospital, and some of the remainder may be attended entirely by midwives. It is evident that a general practitioner cannot study domiciliary midwifery effectively in his own practice alone, for on an average he would take ten years to accumulate records of 150 cases. Therefore, in addition to a small personal series, two much larger groups have been studied, the survey consisting of (1) 168 confinements of patients of a general practitioner between 1946 and 1952; (2) 3,273 confinements of residents in a city in 1949, 1950, and 1951, either at home or in hospital; and (3) 1,000 domiciliary deliveries in the surrounding district but outside the city boundary in the early months of 1952.

TABLE I.—*Number of Primiparae and Multiparae in Each Group, and Place of Delivery*

	Domiciliary			Hospital			Nursing-home		
	Prim.	Mult.	Total	Prim.	Mult.	Total	Prim.	Mult.	Total
Personal	15	85	100	16	28	44	19	5	24
City ..	365	1,119	1,484	892	897	1,789			
County..	176	824	1,000						
Total..	556	2,028	2,584	908	925	1,833	19	5	24

These three groups are called "personal," "city," and "county" cases respectively. The inclusion of hospital and nursing-home cases (Table I) makes it possible to study domiciliary cases in relation to the group from which they were selected, and to consider all the cases for which a general practitioner could assume responsibility.

*A revised version of the Sir Charles Hastings Clinical Prize essay for 1953.

Obstetrics in a Community

The city series consists of almost all births, at home or in hospital, to residents in the City of Gloucester over a period of three years. As it includes 97.4% of all births to city residents, and also 97.1% of all stillbirths and neonatal deaths, it is believed to give a true account of obstetrics in that area, a community of about 67,000 inhabitants.

Supervision of the majority of the 1,484 domiciliary deliveries was carried out by midwives, for practitioners arranged in advance to attend only 242, representing 29.8% and 11.8% respectively of those primiparae and multiparae who were delivered at home. Medical aid was requested during pregnancy, labour, or the puerperium in 26% of all cases.

TABLE II.—*Total Numbers of Certain Types of Case in the City Group, and the Proportions Delivered at Home*

Type of Case	Total No. of Such Cases	Delivered at Home	
		Cases	% of Total
All deliveries	3,273	1,484	45·3
Multiple pregnancy	39	16	41·0
Stillbirth	69	30	43·4
Neonatal death	69	29	42·0
Babies under 5½ lb. (2·5 kg.)	219	93	42·4
Mature stillbirth or neonatal death	62	20	32·2
Ante-partum haemorrhage	29	6	20·2
Post-partum ,,	95	32	33·6
Manual removal of placenta	47	8	17·0
Primiparae	1,257	365	29·0
Primiparous forceps	102	32	31·3
,, breech	43	7	16·2
,, episiotomy	168	28	16·6
Multiparae	2,016	1,119	55·5
Multiparous forceps	15	11	73·3
,, breech	68	24	35·2
,, episiotomy	40	4	10·0

Selection of cases for home delivery, shown in Table II, was, of course, dependent on the force of circumstance and the whims of the patient, as well as on the advice of the attendants. It seems that primiparae and breech presentations were to some extent selected for hospital delivery, but the district took almost its full proportionate share of twins and premature deliveries, and, perhaps in consequence, of stillbirths and neonatal deaths. It is axiomatic that a high foetal risk necessitates delivery under the best possible conditions, and it appears that, although over 50% of deliveries took place in hospital, too many cases in which the baby was in danger were delivered at home. If, however, it had been possible to arrange for all premature babies to be delivered in hospital, the number of babies lost after delivery at home would have been reduced from 59 to 20, a combined stillbirth and neonatal death rate of only 14.2 per thousand.

Table II also shows that only a small proportion of the cases having episiotomies were delivered at home. As the types of case needing forceps delivery and episiotomy are very similar the relatively low proportion of the latter on the district is likely to be due to management rather than to case selection.

The additional 1,000 domiciliary deliveries collected from the county of Gloucestershire include abnormalities in proportions similar to those in the city series, except that the proportions of premature birth, stillbirth, and neonatal death were lower, presumably owing to case selection. Primiparae had apparently been selected for hospital delivery on a rather larger scale, for only 17.6% of the deliveries were primiparous, compared with 24.5% of the city domiciliary cases. Of the county cases, 3% had been induced, either medically or surgically; 30.2% had blood examinations during pregnancy; and 2.8% were admitted to hospital after delivery, half of them for either prematurity or post-partum haemorrhage. The proportion of domiciliary deliveries attended by a doctor, either by prearrangement or in response to calls for medical aid, was 15.6%.

Obstetrics in a General Practice

The personal series consists of the booked maternity cases from a practice rather larger than average, over a period of six years. During that time there were 168 cases booked for delivery under the practitioner's care, either at home or in nursing-homes or hospital, the last being possible only during a period of clinical assistantship and relating to 29 patients. Fourteen patients developed abnormalities and had to be transferred to a hospital where they could not remain under the practitioner's direct supervision, but they have not been excluded from the series on that account. It follows that some forceps deliveries, surgical inductions, and the like were not performed personally.

The average number of antenatal examinations was 8.3, and the two most common abnormalities during pregnancy were breech presentation and hypertension (over 140/90 mm. Hg), with 18 and 14 cases respectively. There were six cases of retroverted gravid uterus, five being corrected by the insertion of a large rubber ring as recommended by Sinclair (1900), and the sixth bimanually. Other abnormalities were multiple pregnancy 3, thrush vaginitis 4, trichomonas vaginitis 1, pyelitis 2, fibroids 2, pelvic tumour (a retroperitoneal fibrolipoma) 1, mitral stenosis 1, anaemia (Hb below 70%) 4, and ante-partum haemorrhage 4. It is notable that there were only two cases of pelvic contraction and that both patients were born prior to the 1914–18 war.

Consultations.—Consultant opinion is easily obtainable either at local clinics or, when necessary, in the home, and there were 33 consultations, for the following reasons: suspected multiple pregnancy 5, breech presentation 2, high head at term 6, toxaemia 4, post-maturity 5, previous obstetric history 4, and 1 each for pelvic tumour, mitral stenosis, retroverted gravid uterus, recurrent pyelitis, deficient perineum, vulval varices, and uterine inertia.

Transfers to Hospital Before Delivery.—Fourteen of the 114 domiciliary and 1 of the 24 nursing-home bookings were transferred to hospital. The principal reasons were collapse of domestic arrangements, and toxaemia, which accounted for two cases each; with one each for uterine inertia, premature labour, mitral stenosis, ante-partum haemorrhage, contracted pelvis, deficient perineum, pelvic tumour, unstable lie, vulval varices, triplets, and suspected diabetes. The cases of unstable lie and triplets account for three of the six babies lost in the whole series so that before labour began it was possible to arrange hospital delivery for half the babies so destined. Of the other three, one was a premature stillbirth, labour being so rapid that transfer was impossible, and the remaining two had gross deformities.

Difficult Cases Delivered at Home

There were, in addition to the cases transferred to hospital, 24 domiciliary or nursing-home cases which were actually or potentially difficult, some of which were the subject of consultation as above. There were nine in which it was decided that a surgical induction was necessary (Table III), and it was decided with some reluctance to deliver one breech and two sets of twins at home. All these could, of course, have been transferred to hospital, or induced at hospital and returned home for delivery. In fact, all but one had uneventful deliveries, the exception being a twin delivery which produced an intra-partum haemorrhage due to premature separation of the first placenta. It was possible to extract the second baby quickly, and a transfusion was not necessary at the time, but a pint (570 ml.) of blood was given during the puerperium.

Two cases of ante-partum haemorrhage were not transferred to hospital. One was a loss of about 4 oz. (110 ml.) at low membrane rupture for post-maturity, but labour

TABLE III.—*A General Practitioner's Booked Maternity Cases Between* 1946 *and* 1952. *Details Relating to Labour and Delivery*

	Place of Delivery		Total
	Home or Nursing-home	Hospital	
Total deliveries	124	44	168
Primiparae	34	16	50
Multiparae	90	28	118
Deliveries attended	106	17	123
Total babies born	126	46	172
Babies under 5½ lb. (2·5 kg.)	2	8	10
Stillbirths	1	0	1
Neonatal deaths	2	3	5
Analgesia:			
Pethidine			84
Gas and air			60
Chloroform			7
Trichlorethylene			92
Induction of labour:			
Medical	25	8	33
Surgical	9	10	19
Uterine inertia	0	2	2
Forceps delivery:			
Primiparae	3	2	5
Multiparae	0	0	0
Breech delivery	1	2	3
Face presentation	1	0	1
Spontaneous P.O.P.	3	1	4
Episiotomy	16	9	25
Perineal tear	35	11	46
Intra- or post-partum haemorrhage	5	2	7
Manual removal	1	0	1
Blood transfusion	3	0	3
Pulmonary embolus	1	0	1
General anaesthesia	5	2	7

started at once and delivery was normal. A second patient lost 1 oz. (28 ml.) at 35 weeks, at a time when she had raised blood pressure. This subsided completely with rest, and she went to term without further loss.

There were three persistent occipito-posterior cases, but all were multiparae, and two delivered themselves easily before the diagnosis was made. The third succeeded after an episiotomy.

Three post-partum haemorrhages were relatively slight and were controlled by ergometrine. The fourth followed a manual removal at which a combination of chloroform and amyl nitrite was used, and the uterus became so atonic that there was heavy loss. No fluid was necessary at the time, but a transfusion was given during the puerperium. The patient could have gone to hospital for the manual removal, but was dealt with at home at her own request.

Finally there were three forceps deliveries. In two cases the head was on the perineum, and in the third only a little higher, and the occiput was anterior in all three. All were fairly easy extractions; but one patient, who had a mild pyrexia for most of the first week, had a small pulmonary embolus on the 18th day, after she had been getting up for a week. Apart from a baby with haemolytic disease whose rhesus-negative mother had been labelled positive, this was the only patient admitted to hospital after delivery, and she was not too upset by the experience to have another baby, normally, two years later.

Post-natal Examination

At post-natal examination, which since the introduction of an appointment system has been attended by 98% of patients, it was noted that failure to restore the perineum completely occurred once in four cases after a tear, but only once in eighteen after an episiotomy. The two primiparae with stress incontinence (Table IV) both had episiotomies, for forceps and breech delivery respectively, and both regained control after faradism. During the two and a half years for which records have been kept of the number of babies entirely breast-fed at the time of post-natal examination, the proportion has been 77.2% and 55.5% for primiparae and multiparae respectively.

TABLE IV.—*Abnormalities Noted at Post-natal Examination Six Weeks After Delivery*

	Total Exams	Cervical Erosion	Prolapse	Deficient Perineum	Stress Incont.	Retroversion	Hypertension
Primiparae	43	2	6	7	2	6	7
Multiparae	99	4	13	17	5	20	3
All cases	142	6	19	24	7	26	10

Forceps Delivery

The forceps rates shown in Table V illustrate the well-recognized difference between primiparae and multiparae, the rates being 1 in 10 and 1 in 128 respectively. The caesarean section rate in the area is 1.06%.

TABLE V.—*Forceps Rates, and the Number of Babies Lost After Forceps Delivery*

	Primiparae				Multiparae			
	Total Cases	Forceps Cases	Rate %	Babies Lost	Total Cases	Forceps Cases	Rate %	Babies Lost
Personal series	50	5	10·0	2	118	0	0	0
City and county domiciliary cases	541	55	10·1	4	1,943	19	0·9	1
All city cases	1,257	102	8·1	9	2,016	15	0·7	1

It would be useful to be able to predict the probability of a forceps delivery either before the end of the first stage of labour or, better still, during pregnancy. Table VI, which refers only to the primiparae of the county series, shows what would have been the effect on the number of primiparous forceps deliveries at home if certain groups of these patients had been selected, either before the onset of labour or during the first stage, for delivery in hospital.

TABLE VI.—*The Probable Effect on the Number of Primiparous Forceps Deliveries at Home if Certain Groups of Those Patients Delivered at Home Had Been Transferred to Hospital for Delivery*

If the Types of Patient Below had been Transferred to Hospital for Delivery	The Total Number Transferred Would Have Been	The Number of Primiparous Forceps Deliveries	
		Among Those Transferred	Among Those Remaining at Home
All primiparae	176	23	Nil
Primiparae over age 30	12	6	17
" " " 35	6	3	20
Primiparae with delayed 1st stage:			
Over 24 hours	20	8	15
" 36 "	8	4	19
Primiparae over age 30 or with 1st stage over 24 hours	30	12	11

The admission of all primiparae shows a poor return for the number of beds taken up. Each of the other groups has a forceps delivery rate of more than 1 in 3, and there seems to be a good case for recommending hospital delivery for primiparae over 30 years of age, and for those not fully dilated after 24 hours in labour, if it is desired to avoid forceps delivery at home. But the home rate would not have been reduced below 1 in 15, and the only patient who lost her baby would still have been delivered at home.

Table VII refers to the domiciliary cases in the city series, and compares the forceps delivery rates and the length of

TABLE VII.—*Comparison of Forceps Rate and Average Length of Second Stage in Forceps Cases, in Maternity and Midwifery Cases in the City Domiciliary Series*

	Primiparae				Multiparae			
	Total Cases	Forceps Cases	Forceps Rate %	Average 2nd Stage	Total Cases	Forceps Cases	Forceps Rate %	Average 2nd Stage
Maternity cases	109	19	17·9	1 hr. 53 min.	133	5	3·7	1 hr. 35 min.
Midwifery cases	256	13	5·0	3 " 16 "	986	6	0·6	2 " 21 "

the average second stage in "maternity" and midwifery cases, maternity cases being those in which a practitioner had arranged in advance to attend the delivery.

In comparison with that for midwifery cases, the forceps rate for maternity cases is more than three times as high for primiparae and six times for multiparae. Even when allowance is made for the time taken to call a doctor, 3½ hours is long for the average second stage, and the extreme was 5 hours 40 minutes.

In addition to the long second stages ending in forceps delivery, there are many ending in normal birth, and the number of second stages exceeding various lengths has been determined in the primiparae of the county series, being shown in Table VIII.

TABLE VIII.—*Showing the Number of Patients, out of the 176 Primiparae of the County Series, Whose Second Stage of Labour was Prolonged, and the Number Eventually Delivered with Forceps*

	Length of Second Stage of Labour in Hours				
	2 or More	2½ or More	3 or More	4 or More	5 or More
Total cases	44	32	23	9	3
Forceps deliveries ..	20	18	14	4	0

Many would think it unwise to tolerate a high proportion of long second stages, and, even without resorting to a high forceps rate, it may be unnecessary to do so. Table IX compares the primiparous forceps and episiotomy rates, and the proportion of primiparae having second stages of over three hours and four hours in the county series, with the corresponding figures for personal cases; it appears that a large proportion of long second stages can be eliminated by episiotomy.

TABLE IX.—*Comparison of Forceps and Episiotomy Rates in Primiparae of the Personal and County Series, Showing the Proportion of All Cases Having a Long Second Stage*

	Forceps Rate %	Episiotomy Rate %	Length of Second Stage	
			Over 3 Hours	Over 4 Hours
County cases ..	13·0	7·4	13·0%	5·1%
Personal cases ..	10·0	36·0	2·0%	Nil

It is possible that some of the forceps deliveries might also have been eliminated by preliminary episiotomy, for Table X shows that an episiotomy was carried out in less than one domiciliary forceps delivery in four.

TABLE X.—*Condition of Perineum After Forceps Delivery at Home*

	Forceps Deliveries	Condition of Perineum			
		Intact	Episiotomy	Tear	Third-degree Tear
Primiparae	55	16	15	24	4
Multiparae	19	9	2	8	0
All cases	74	25	17	32	4

Suturing was avoided in only 25 cases out of 74, and at a cost of four third-degree tears. This alone seems too high a price to pay; in addition there is the greater difficulty of repairing tears as compared with episiotomies, and there may be concealed vaginal lacerations and stretched levatores ani in those cases in which the perineum is intact. Four primiparae and two multiparae were delivered face to pubes without episiotomy, but as these account for only one of the third-degree tears it is not enough to perform the episiotomy only when the baby is so delivered. It appears that episiotomy is a desirable preliminary to most if not all forceps deliveries, and, performed before an anaesthetic is given in those cases in which the head is on the perineum, it may make forceps delivery unnecessary.

Breech Presentation

Breech delivery can be foreseen and, to a great extent, prevented. The domiciliary obstetrician can, if he chooses, reduce the breech delivery rate to very small proportions, and he can arrange in advance for the inevitable cases to be delivered in hospital. This survey includes 51 breech deliveries at home, with the loss of 23.5% of the babies. Not all were lost as a result of breech delivery itself, but, after excluding all babies weighing less than 5½ lb. (2.5 kg.) and all in whom there was an obvious cause of death other than breech delivery, the percentage loss remains formidable, and is shown in Table XI, where it is compared with results obtained in hospital.

TABLE XI.—*Proportion of Babies Lost, Either by Stillbirth or Neonatal Death, Following Breech Delivery, After Eliminating all Babies Weighing Less than 5½ lb. (2.5 kg.) and All in Whom There Was an Obvious Cause of Death Other Than Breech Delivery*

	Corrected Loss %		
	Primiparae	Multiparae	All Cases
Domiciliary cases ..	25·0	10·2	13·7
Hospital „ ..	11·1	9·0	10·0

These figures suggest that there would still be a very considerable mortality after breech delivery if all such cases were delivered in hospital. Cox (1950) has shown that the mortality for mature babies after breech delivery can be much lower than this, but the figure of 5.2%, extracted from his findings, may not be universally attainable, for it related to a centre dealing with a large number of cases, and involved a caesarean section rate of 12.4%. A low mortality in a small centre might be dependent on a high breech delivery rate to provide the staff with enough practice in breech delivery, and this would tend to cancel the gain due to a lower mortality. It does not appear that the problems of breech delivery can be solved merely by the transfer of cases to hospital.

In the personal series, version was performed whenever a breech presentation was diagnosed after the 30th week, and there were only two inevitable breech deliveries—a rate of 1.19%. Abercrombie (1952) performed version as soon after the 30th week as he felt that it was becoming difficult, and had only two breech deliveries in 249 cases. Dalley (1952) quotes a series of 576 booked cases in which early version resulted in a breech delivery rate of 0.86%. If the breech delivery rate in the city had been reduced to 1%, the number of babies lost would probably have been halved, allowing for the mortality of version. Since this would achieve the same saving in babies' lives, without the risks of a caesarean section rate of 12.4%, as would reduction of mortality to Cox's figure, it suggests that the primary aim in a small centre should be not the reduction of mortality but the elimination of breech delivery itself.

The Perineum

It is difficult for the general practitioner to observe a large number of normal primiparous deliveries, because the number delivered at home is small, and before 1948 he could attend normal cases only if the patient could afford to pay private fees. Table XII records the fate of the perineum in all the personally observed normal primiparous deliveries during a period of six years, including a few not qualified for inclusion in the personal series. These cases can be

TABLE XII.—*Fate of Perineum in 40 Personally Observed Normal Primiparous Deliveries*

No Delay on the Perineum			Delay on the Perineum		
Intact	Tear	Episiotomy	Intact	Tear	Episiotomy
10	16	2	0	2	10

divided into three groups: (1) no undue delay and an intact perineum, 25% ; (2) no undue delay but a torn or incised perineum, 45% ; and (3) delay on the perineum, 30%.

The delay in most of the cases having an episiotomy for delay was very considerable, for many date back to a time when episiotomy was used reluctantly. In retrospect it is thought that at least one, and possibly two, of the forceps deliveries in the personal series could have been avoided if an incision had been made before the patient and the uterus had become too exhausted to make full use of it. If this is correct, second stages of over three hours could have been eliminated from the personal series, at the same time reducing the primiparous forceps rate to 6%. These results suggest that nearly one-third of primiparae need episiotomy to avoid delay on the perineum, and to avoid the forceps delivery that may result if the perineum resists until the patient and the uterus are exhausted.

Table XIII shows tear, episiotomy, and suture rates in cases having a normal delivery. Episiotomy was rarely used in the absence of a doctor, and in multiparae the absence of a doctor reduced the incidence of recorded tears by nearly a half, although it is likely in all cases, and quite certain in the personal ones, that the actual delivery was almost invariably controlled by the midwife.

TABLE XIII.—*Fate of Perineum in Normal Domiciliary Deliveries, Showing Effect of the Presence of a Doctor*

	Primiparae			Multiparae		
	Tear Rate %	Episiotomy Rate %	Suture Rate %	Tear Rate %	Episiotomy Rate %	Suture Rate %
County and city cases:						
Doctor present	38·7	14·4	53·1	25·6	2·2	27·9
Doctor not present	34·1	3·0	37·1	13·3	Nil	13·3
Personal cases ..	36·3	27·2	63·5	25·6	5·1	30·7

Post-partum Haemorrhage

The post-partum haemorrhage rate in domiciliary cases varied with parity, being 2.6% for primiparae and 6.9% for patients with a parity of five or more. A much greater difference, however, is that between normal and forceps deliveries (Table XIV), possibly due to the use of chloroform, which, in the city series, was certainly used in 67% of forceps deliveries, and possibly in 87%.

TABLE XIV.—*Post-partum Haemorrhage Rate in Domiciliary Cases, Showing the Difference Between Forceps Deliveries and Normal Deliveries*

	Total Cases	Post-partum Haemorrhage	
		Cases	Rate %
All deliveries	2,484	70	2 8
Forceps deliveries ..	74	10	13·2
All deliveries, excluding forceps	2,410	60	2·4

Lister (1950) suggested that the use of ergometrine at the end of the second stage should be practised only under hospital conditions, where team-work is possible. To explore the possibility of using it routinely in domiciliary work, the intention recently has been to give it to all cases in the personal series. Over a series of 48 consecutive domiciliary deliveries it was found possible to give an intravenous injection between the time of head crowning and of birth of the anterior shoulder in 64% ; it is considered that, after elaborating a routine and working with the same midwife, the proportion could be raised to 80%. In domiciliary practice, where blood transfusion is not readily available, it is particularly important to prevent post-partum haemorrhage, and there is no doubt that the use of intravenous ergometrine is a great advance in this direction. If it cannot be given in all domiciliary cases it seems most important to make the attempt in all cases of forceps delivery, and in all those with a parity of five or more.

Hypertension in Pregnancy

Hypertension has been studied only in the personal series in which patients were normally examined monthly from the time of booking up to 32 weeks, at 34 weeks, at 36 weeks, and then weekly until delivered. Where necessary, several readings were taken to eliminate labile pressures. The cases have been divided into three groups according to the highest stable pressure recorded in late pregnancy (Table XV): 14% of primiparae and only 1% of multiparae qualify for the highest group, which is 87% primiparous, confirming the higher incidence of toxaemia in primiparae. In 46% of primiparae a pressure of 130/85 occurred at some time during late pregnancy, and 18% developed albuminuria.

TABLE XV.—*Hypertensive Patients of Personal Series Divided Into Three Groups According to Highest Pressure Reached in Late Pregnancy. Bracketed Figures Show the Number Developing Albuminuria*

	Total Cases	Highest Pressure Recorded in Late Pregnancy		
		Between 130 85 and 140/90	Between 140/90 and 150/100	150/100 and Over
Primiparae ..	50	9 (0)	7 (4)	7 (5)
Multiparae ..	118	7 (1)	7 (2)	1 (1)

Of the first six primiparae in the personal series, two developed toxaemia severe enough to require admission to hospital and premature induction, both having a considerable amount of albumin. In restrospect it was thought that insufficient attention had been paid to slight early rises of pressure in these cases, and since then the following regime has been instituted.

Stage 1.—Blood pressure over 120/80. No work except light household duties. Rest from 2 to 3 p.m. Bed at 9 p.m.

Stage 2.—Blood pressure over 130/85. As Stage 1, but bed until 10 a.m. Rest from 2 to 4 p.m. Phenobarbitone, ½ gr. (32 mg.) three times a day.

Stage 3.—Blood pressure over 140/90. Complete rest in bed. Phenobarbitone 1 gr. (65 mg.) three times a day.

This regime has been varied a little to suit individual cases, according to parity, age, the lowest pressure recorded in mid-pregnancy, and the presence of albumin or oedema. It has not prevented 45% of primiparae from developing a pressure of 130/85 or more, and 25% have required rest in bed. Four (9%) eventually passed the 150/100 level, but only two needed induction before term. There were no babies under 6 lb. (2.7 kg.) in weight, and none appeared to be in real danger on account of toxaemia. The number of cases is, of course, so small that a similar result might well have been obtained by chance.

Induction of Labour

McKiddie (1949), using figures for Aberdeen, showed that the stillbirth rates for patients delivered in the second, third, and fourth weeks after term were about 1 in 60, 1 in 30, and 1 in 15 respectively. The neonatal death rates were unaffected. McKeown and Gibson (1951) showed that the stillbirth rate in Birmingham in 1947 was 11.5 per thousand for babies born in the 41st and 42nd weeks, and 25.5 for babies more than two weeks post-mature.

In the personal series the policy has been to induce at about two weeks after the expected date, if that seemed reliable. In addition, patients with a raised blood pressure were rarely allowed to go past term. This has led to a very high induction rate, and the proportion of patients successfully induced was 21.4% (Table XVI).

For post-maturity 13% of all patients were induced, and for toxaemia 16% of primiparae and 1.7% of multiparae. There was only one stillbirth in the whole series, this baby being five weeks premature and not induced. Only one baby was lost after induction, this being the neonatal death of a post-mature monster.

The results so far recorded in this small series do not indicate the need for a change in the policy regarding in-

TABLE XVI.—*Medical and Surgical Induction in Personal Series*

	Total Cases	Medical Induction			Surgical Induction	Induction Rate (Successful Cases Only)
		Total	Failed	Successful		
Primiparae	50	14	4	10	10	40·0%
Multiparae	118	19	12	7	9	13·5%
All cases ..	168	33	16	17	19	21·4%

duction, but a simple calculation based on McKeown and Gibson's figures shows that, if the average general practitioner eliminates post-maturity of more than two weeks' duration from his domiciliary practice, he will save the lives of only 1.5 babies in his lifetime.

Stillbirths and Neonatal Deaths

McKeown and Gibson (1951), who investigated all births in the City of Birmingham in 1947, suggested that babies born more than four weeks before the expected date should be delivered in hospital whenever possible. They showed that such babies had a collective mortality of 1 in 3, but the mortality for babies born in the 36th and 37th weeks was 150 and 94 per thousand respectively. This suggests that, for babies born prematurely, a dividing line between suitability for hospital and home delivery might be placed at an expected mortality of 100 per thousand. The line would not necessarily be at the same level for other types of case, for the difference in the relative safety of hospital and home delivery may vary. It would, for instance, be very considerable for a primiparous breech delivery, and almost non-existent for a normal patient having her second baby. It has not been possible in this survey to attempt to compare the results of hospital and home delivery of identical cases, but Table XVII shows the total mortality, stillbirths, and neonatal deaths together, for certain types of patient and for certain abnormalities.

TABLE XVII.—*Total Mortality, Stillbirths, and Neonatal Deaths Together, for Certain Types of Patient and for Certain Abnormalities*

	Babies Lost per 1,000 Births	
	All Domiciliary Cases	All City Cases
All first births	45·7	52·7
„ other „	29·5	34·7
Babies over 5½ lb. (2·5 kg.):		
First births	17·9	26·7
Other „	14·9	16·0
Forceps deliveries:		
All cases	67·5	85·4
First births	72·7	88·8
Breech deliveries:		
All cases	235·2	207·2
First births	250·0	232·5
Over 5½ lb.	139·5	144·3
Multiple births:		
All cases	229·1	191·5
Over 5½ lb.	100·0	111·1
All babies under 5½ lb. ..	330·8	347·0

Many of these groups are composite, and, if the total numbers had been large enough, might have been broken down into smaller groups with varying mortalities. For instance, twins in a multipara, if both were presenting by the vertex and were expected to be over 5½ lb. (2.5 kg.), might be expected to have a mortality appreciably lower than 100 per thousand. With such reservations, it seems that all breech, multiple, and premature deliveries should take place in hospital. First births, however, if the baby is mature, are relatively so innocuous that it seems ridiculous to suggest that primiparity alone is a reason for hospital delivery, for the rate for those at present selected for home delivery is at the low figure of 17.9 per thousand, and is only 3 per thousand higher than the corresponding figure for multiparae.

The General-Practitioner Obstetrician

When the National Health Service was introduced the conception of the general-practitioner obstetrician appeared to be one who had postgraduate experience of obstetrics, examined his patients at 12 weeks, 36 weeks, and 6 weeks after delivery, and, apart from that, merely attended abnormal cases at the request of the midwife. By and large, unless his midwives are exceptional, this type of practitioner will not see anaemia of pregnancy in time to cure it without transfusion, hypertension in its earliest stages at a time when it may be possible to prevent serious toxaemia and to avoid premature induction, breech presentation in time for early version, or multiple pregnancy in time to advise on the avoidance of premature labour. Post-maturity will not be eliminated, his primiparae and their foetuses will endure unnecessary hours of the second stage, little will be done to prevent post-partum haemorrhage, and the vulval orifices of his multiparae will enlarge a little at each delivery because minor tears will be left unsutured.

If the results of domiciliary midwifery have been bad in the past, it is important, before attempting to improve matters by introducing a special obstetric list, to inquire why it was so, and whether the same causes would operate in the future. One cause, possibly the major one, was that the family doctor could undertake only the maternity work for which his patients could afford to pay—and that in many practices was very little. Many patients who did engage him wished to pay not for antenatal and post-natal care, but only for analgesia at the delivery. This gave the family doctor very little experience of the normal and little opportunity of practising preventive obstetrics, but, on the other hand, arrangements for consultant help were often inadequate, so that he was obliged to undertake difficult abnormal cases in response to midwives' requests for help. Local authority schemes, when introduced, allowed the practitioner to examine his patients at 12 and 36 weeks, but did not permit him to be paid for any other attendance on normal cases. The result was that, having seen little of the normal, and having had little opportunity of preventing the abnormal, he was obliged to deal with the latter when it occurred.

Since 1948 it has been possible for the family doctor to give adequate attention to all cases, normal and abnormal. Specialist opinion is easy to obtain, and the opportunity exists for the next generation of family doctors to acquire adequate experience of normal midwifery, to learn to recognize the abnormal at an early stage, and often to prevent the occurrence of dangerous conditions. If this is likely to happen, it is not at all certain that the maternity services will be improved by regulations aimed at making the patient forsake her family doctor for a stranger with a little more experience of abnormal obstetrics.

In any discussion of the competence of the newly qualified practitioner it will inevitably be said that he has no experience of forceps or breech delivery. In practice, as the average family doctor has only one imperative forceps delivery in two years, and as most are either able to carry out a forceps delivery or have the help of a competent colleague, it is no more necessary for the inexperienced single-handed practitioner to apply forceps himself than it would be for him to remove an appendix on the kitchen table. The number of such cases is so small that he need not hesitate to call a consultant. As for domiciliary breech delivery, it is too dangerous to be justified, and the inability to conduct a breech delivery, an abnormality which can be foreseen, does not prevent the family doctor from being an adequate domiciliary obstetrician if he aims at the avoidance of breech delivery altogether, handing the inevitable cases over to hospital.

It may be true, as Farquhar Murray (1952) says, that there are insufficient forceps deliveries to permit the student to perform even one before qualification, but the same explanation cannot be offered if he has not sutured a perineum, for there are about a quarter of a million to repair per annum in England and Wales. It is an essential accomplishment for the domiciliary obstetrician, but it can, and should, be taught before qualification.

In dealing with hypertension, the inexperienced practitioner who knows a few simple rules and sees his antenatal

patients regularly will see serious cases of toxaemia so rarely that the postgraduate obstetric experience necessary to decide when to induce before term, or when to carry out a caesarean section, would rarely be of use to him. When the need arose —say once in two or three years—the help of a specialist could be obtained.

It does not need postgraduate obstetric experience to select for hospital women who have had many previous deliveries and those with a history of an abnormal third stage, or to prevent pregnancy anaemia, or to give an intravenous injection when the head crowns. Students are familiar with intravenous infusion, and any enthusiast who has provided himself with ergometrine, suitable fluid, and a "giving" set, can greatly reduce the incidence and danger of post-partum haemorrhage, and, in the occasional difficult case, keep the patient in good condition until the flying squad arrives.

The possibility of disproportion causes much concern, but, because rickets in childhood has been eliminated almost completely, pelvic contraction is rare and likely to become more so. The only two cases in the personal series were aged 37 and 41, an incidence of 6% in patients over 35 and nil in younger patients. If consultant opinion is available the family doctor should not meet serious trouble with disproportion.

These are some of the more common abnormalities with which the domiciliary obstetrician has to deal. There are many others, but in domiciliary practice most of them are rare. The number of years for which the average family doctor would have to practise to see a case among his domiciliary patients is, for prolapsed cord, 10 years; transverse presentation in labour, 10 years; mento-posterior presentation, 40 years; brow presentation, 50 years; hydatidiform mole, 50 years; ruptured uterus, 300 years; inverted uterus, 600 years. Averages cannot be applied to individuals, but they help to keep a sense of proportion. General practice would be impossible if one of the qualifications for it were postgraduate experience of abnormalities unlikely to be encountered in 10 years of practice.

There are good reasons for making adequate experience in obstetrics an essential qualification for practice in remote country districts, but it appears equally clear that any family doctor who is interested in obstetrics, and who, as a student, has had adequate instruction in the aspects of midwifery likely to be met in general practice, can be allowed to supervise maternity cases in any area where consultant support is available, without the risk of serious consequences for his patients. The role of practitioners with postgraduate obstetrical experience should be to practise either in country areas where consultant help is not readily available or as members of a group, where, by helping their colleagues with difficult cases and by providing a liaison between them and recent advances in obstetrics, they can help to maintain a high standard throughout the group, without taking the day-to-day care of maternity cases out of the hands of the family doctor.

Summary and Conclusions

An inquiry has been made into the practice of obstetrics (1) in a general practice over a period of six years; (2) in a community of 67,000 inhabitants over a period of three years; and (3) in a further 1,000 domiciliary deliveries.

In group 1 the case records were those of a medical practitioner, and in groups 2 and 3 those of midwives. The following suggestions are offered.

Premature delivery, breech delivery, and multiple birth carry a stillbirth or neonatal death rate too high to be acceptable for domiciliary delivery. The rates for first births do not suggest that normal primiparae should be delivered in hospital.

Domiciliary forceps delivery is inevitable in a small proportion of cases, but the risks are not great. The proportion can be reduced considerably if hospital delivery is arranged for primiparae who are over 30 years of age or who are not fully dilated after 24 hours in labour.

More frequent use of episiotomy in domiciliary work would reduce the forceps rate and the incidence of severe tears, and would avoid many long second stages of labour.

Toxaemia can be controlled to a very great extent if blood pressures are observed frequently and if adequate attention is paid to slight rises.

Intravenous ergometrine at the end of the second stage can be used with advantage in domiciliary practice, particularly in forceps deliveries.

Interest in obstetrics and adequate instruction as a student are the only essential qualifications for the family doctor who wishes to practise obstetrics in an area where consultant support is available.

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CONDITIONS ASSOCIATED WITH THE GROWTH OF BOYS, 1950-1

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The changes which have taken place over the years in the growth of children are generally, and we think rightly, attributed to improvements in their food. Whereas during the slump years dietary surveys showed a grossly deficient diet, a study made in 1949 by Beltram and Bransby (1950) of children from the lowest income group (parent earning £4 10s. or less a week) showed average intakes which compared "satisfactorily" with the recommendations of the B.M.A. Committee on Nutrition (1950) in respect of all nutrients with the exception of vitamin D, the requirement of which at school age is still a matter of complete uncertainty. If this was the case for the lowest income group, then it could be argued that an actual margin of safety existed in higher income groups. It is, of course, obvious that about half of the group surveyed by Beltram and Bransby must have had intakes below the B.M.A. recommendations, but nutritional "standards" are set, deliberately, on the safe side of the optimum, and it is at least questionable whether many boys, even in this group, consumed too little of any nutrient.

There is, too, evidence from the past to suggest that schoolboys' diets may now be adequate. The last large milk-feeding experiment, carried out for a year on 2,800 children in 1934–6, showed gains in height and weight

in all groups; but they were small and none was statistically significant; the opinion that they were, in fact, real was formed on the grounds that they were consistently found in all of the groups. Since then, not only has milk been added to the diet of school-children, but their diet has been enormously improved in other respects. Again, a feeding experiment carried out during the war (Bransby, Burn, Magee, and MacKecknie, 1946) tested the effect of a supplement of vitamins A and B_1, riboflavine, nicotinamide, ascorbic acid, and vitamin D on 800 children for a year. No effect was observed on growth, strength, endurance, or absenteeism.

It is of interest, then, to note that well-marked differences in stature still exist in children, not only between the lowest income group and the one above it, but fairly evenly throughout most of the social scale.

Cause of Differences in Stature

In view of the evidence cited above, it is worth while to consider the other possible causes for these differences in stature. The first is that these differences are hereditary. But the considerable changes in stature that have occurred as a result of environmental change should make us very wary of accepting this. The finding of Weir (1952) that "secular changes in growth are similar to the differences in growth associated with differences in social condition" adds point to this.

Another possibility is that the rate of growth is inexorably set as a result of conditions in the early years of life, and if these are adverse no subsequent improvement can lift the child out of his "growth channel." This has been shown to be the case in underfed pigs by McMeekan (1940), and in his study certain changes in skeletal proportion occurred, which, as Leitch (1951) has pointed out, are similar to skeletal differences to be found between children of different social classes. But application of the findings of animal experiment to man needs always to be made with caution. Moreover, Bransby (1953), studying the diets of 461 children over 6 months and under 5 years in 1951, found that in high income groups the nutrient intake was just as often below the optimum in some respect as it was in the low income groups; yet, at any rate by the age of 6, differences in stature can be demonstrated in association with social class. Nevertheless, the work of Yudkin (1952b), in which a liver supplement fed to small children on an otherwise excellent diet enhanced growth, reminds us that all may not yet be known concerning the essentials for growth.

A further possibility is that some factor other than diet may operate to an important degree to-day. This has never been adequately explored because, as Cruickshank (1951) has put it, "heredity and environmental factors—nutrition, poor housing, lack of sleep, infectious disease—are inextricably interrelated in determining the growth and development of children." The only instance, so far as we know, in which a non-dietary factor has been demonstrated to affect the growth of children in the mass was reported by Widdowson (1951). German orphans, she found, grew better when the matron in charge of them was motherly and kind than when she was severe, though their diet remained the same. Other non-dietary factors have never been studied in isolation. For example, no one can be confident that the environment of our great industrial cities is favourable to the growth of children, and it is in these, typically, that growth rates are least.

We may presume that the answers to all these problems will ultimately be writ clear in the stature of future generations. There are, too, long-term research studies afoot which may somewhat anticipate the event. But in the meantime we do not even know whether there may not be conditions affecting the stature of large numbers of children and thus preventing them from benefiting fully from improvements in their diet. The public health aspects of this question appeared to us of sufficient importance to warrant a reconnaissance.

The Investigation

The plan of investigation was as follows. In Beltram and Bransby's survey the intakes of Salford schoolboys were analysed separately and found on the whole to be slightly higher in most nutrients than the rest. Salford is an industrial city, with mean crowded houses, and much smoke and rain. Here, therefore, non-dietary conditions might be expected to operate at a maximum, and dietary ones at a minimum. The stature and physique of Salford boys, at three age levels, were therefore compared with those of boys at Kingston-on-Thames, a sunny pleasant town. At each place, each age group was examined at one season and in the same year. At Bristol a study was carried out on a larger group of 14-year-old boys, and the findings were analysed in terms of social class and similar factors. Our aim was to test whether the differences between stature and physique in industrial and other areas were similar to the differences that occur between different social groups—in effect, an extension of Weir's dictum quoted above.

In addition, we obtained at Bristol as much information as we could about dietary and non-dietary factors. Before the war Bristol built a large housing estate for families who had previously lived under slum conditions in the city. Data on these boys were compared with those on boys still living in the heart of the city. Thus the environmental differences between these groups reflected *in parvo* those seen *in magno* in Salford as compared with Kingston. Since we interpreted Widdowson's study as showing the effects of mental stress, we analysed separately the weights, in Bristol, of boys from "broken homes," in which category we include parental death and divorce and illegitimacy. We also compared boys whose mothers went out to work with those whose mothers did not, for it had been retailed to us elsewhere that children often came home to an empty house, or even had to wait outside a locked door, and that they were on occasion sent to school when they should really have been in bed, because the mother could not afford to lose her day's work; we therefore felt that in this group some form of mental stress might operate. One further point was tested: in our surveys in previous years it had been the practice to record the number of boys who had a "tired expression." Inquiry had shown that a high proportion of them shared beds, and, to judge by their looks, did not get enough sleep. We therefore analysed our findings in terms of those who did and those who did not share beds.

Physical Findings

Stature and Physique.—Table I gives the mean heights and weights of boys in the different groups, and the numbers involved. The children at all ages are lighter and shorter at Salford than at Kingston, and at Bristol the modern-school boys are lighter than the grammar-school boys, who are in turn lighter than public-school boys. We compared the height/weight ratio in the different groups to test whether they showed the tendency, reported by Weir,

TABLE I.—*Weight and Heights of Boys in Different Parts of Britain*

	Age	No.	Weight in kg.	Height in cm.
Salford	6 years	149	20·83±2·45	114·38±5·08
Kingston ..	6 ,,	197	22·63±2·72	118·00±5·69
Salford	10 ,,	197	28·78±4·24	133·76±5·40
Kingston ..	10 ,,	135	32·70±4·79	139·61±6·10
Salford	14 ,,	206	44·39±9·14	154·10±9·09
Kingston ..	14 ,,	190	48·61±8·3	160·50±8·57
Bristol:				
Modern ..	14 ,,	210	46·78±7·62	158·39±8·99
Grammar ..	14 ,,	167	50·52±8·02	164·82±8·71
A public school	14 ,,	76	51·63±6·71	166·50±7·82

towards a slimmer build where mean growth was greater. No consistent or statistically significant differences were found. As a further test, we expressed the biacromial and bitrochanteric diameters, and the chest girth, as percentages of height (Table II). It will be seen that in every set of comparisons the group shown in Table I to be taller and heavier is also slimmer.

TABLE II.—*Biacromial, Bitrochanteric, and Chest Measurements Expressed as a Percentage of Height*

	Age	Bitrochanteric	Biacromial	Chest Circumference
Salford	6 years	18·8	22·7	49·7
Kingston ..	6 ,,	18·2	22·3	48·2
Salford	10 ,,	18·6	22·0	—
Kingston ..	10 ,,	18·1	21·3	—
Salford	14 ,,	18·9	21·8	47·0
Kingston ..	14 ,,	18·6	21·5	45·3
Bristol:				
Modern ..	14 ,,	18·6	21·0	46 2
Grammar ..	14 ,,	18·3	21·0	46·1
A public school	14 ,,	18·0	20·8	45 6

Development.—Following on Greulich's work in America, Ellis (1947) showed that Barnardo boys who became pubertal early grew more rapidly than their fellows. The differences here were presumably genetic in origin, but data collated by Stuart (1946) show that improved socio-economic circumstances accelerated the onset of puberty. We therefore studied the stage of puberty in our 14-year-old boys. We held that because we knew the plan of our study, and the place of our different groups in it, unconscious bias could creep in, and we therefore concentrated on the physical index of puberty which we considered the least subjective—namely, the condition of the pubic hair. We felt our groups were large enough to offset the errors due to the use of a single criterion. We recorded four degrees; complete absence of hair (PH−), a few downy hairs (PH±) an intermediate stage (PH), and a well-developed escutcheon (PH+). At Bristol we were fortunate in having as a check the findings of Drs. Irving-Bell and Fraser, of the Bristol school medical service, on the same boys. They used a system of classification to which they were accustomed, with three grades only, but the trend of their findings clearly confirms our own (Table III). There is a lag in puberty in Salford compared with Kingston, and in Bristol modern compared with grammar schools.

TABLE III.—*Percentage in Each Group at Different Stages of Puberty From Pre-pubescence (PH−) to Adolescence (PH+)*

	PH−	PH±	PH	PH+
Our findings (P.J.C.):				
Salford schools	33·8	11·7	40·0	14·5
Kingston ,, ...	13·4	22·6	22·6	41·4
Bristol modern schools ..	10·8	18·5	40·0	30·7
Bristol grammar ,, ..	7·8	15·0	26·1	51·1
Public school	7·9	19·7	32·9	39·5
Dr. Frazer:				
Bristol modern (71 boys)	25·4	60·5	14·1	
,, grammar (55 ,,)	2·9	45·4	52·7	
Dr. Bell:				
Bristol modern (138 boys)	13·0	44·9	42·0	
,, grammar (106 ,,)	8·5	28·3	63·2	

Pallor.—Yudkin (1952a) reported that pallor was associated with underdevelopment. Differences in lighting, etc., made it impossible to compare our groups with one another, but a comparison could be made within each group. Only about 20 boys in each group were recorded as pallid, but in each case they were on average lighter than their fellows. The difference was on average about 4%. On the other hand, no consistent difference whatever was recorded in height.

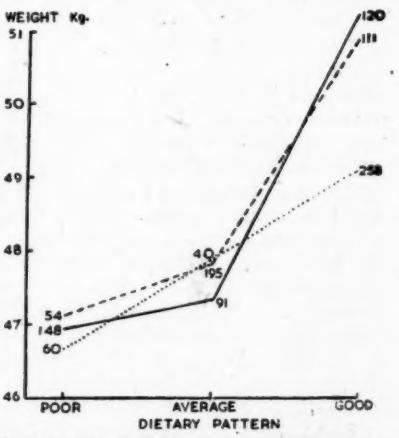
Fat Covering.—Because pallor is an early sign of undernutrition, data on the skinfold thickness of our groups are of interest. There were no statistical differences between the mean readings of comparable groups, but when we separated in each group the "thin" boys (with readings below the norm for all boys of their age group) and others, the former showed consistently lower mean weights, and, with the exception of one group, the Kingston 6-year-olds, in which there were only 28 "thin" boys, consistently lower mean heights. It is to be expected that the "thin" boys would be slighter, but it is surprising that they should also be shorter. Details both of these findings and of those relating to pallor are omitted for reasons of space.

Environmental Conditions Associated with Difference in Stature

In relating environment to stature, weight only was taken into account. Height varied similarly, but in less degree, and there was therefore no point in including it. The data given below are from Bristol only. In a few cases in which the information provided was inadequate the boy was excluded from that part of the analysis.

Diet

It was not practicable to carry out detailed dietary surveys of such large numbers of boys. Instead, each boy was questioned about the frequency with which meat or fish was provided for him, upon the number of times a week that he ate fresh fruit, and on the amount of milk he consumed, which was checked by determining the amount delivered daily for the family, and making allowances for the other members (their ages were known); the amount drunk at school was known. The whole of this work was done by Miss C. M. Wood, nutritionist on the staff of the M.O.H., Bristol. The diets have been classified as "poor," "average," and "good," in the case of each of the three indices, on the following basis: "Poor" = Meat or fish once or less a day; milk less than half-pint daily; fruit less than every other day. "Good" = Meat or fish for more than two meals daily; milk one pint daily or more; fruit daily. The average diet was intermediate between these. Obviously the biochemical content of the diet cannot be assessed by this means. But an indication is provided of the extent to which variety enters into the diet, and it is axiomatic that the greater the variety the greater the likelihood that the diet is balanced.



Graph showing association between dietary pattern as indicated by number of servings of various foodstuffs, and weight. ———, Meat and fish. – – – –, Milk ·····, Fruit.

As the graph shows, whatever criterion is used the mean weight increases progressively from "poor" to "good." The differences between the extremes are statistically significant in the case of meat and fish, and of milk.

Non-dietary Conditions

Parental Care.—Each boy's home was visited by a health visitor and an assessment made of the standard of parental care. The mean weight of 122 boys with "very good" parental care was 51.63 kg.; of 220 with "normal" parental care it was 47.16; of 17 with "bad" parental care it was 46.26. The first of these differences is statistically significant, and the second is in keeping with the trend of the data.

Parent's Occupation: Type of School.—The Registrar-General's classification was used (here written R.G. I to V in

descending social order). There was a relation between R.G. category and weight, in grammar schools the means (in kg.) being R.G. I and II, 52.95; III, 49.86; IV, 48.87; V, 47.38; and in modern schools 47.64, 46.89, 46.85, and 46.37 respectively. It may be noted that in every case grammar-school boys are heavier than modern-school boys of the corresponding R.G. group. In general, grammar-school boys have passed, and modern boys have failed, an examination at the age of 10–11 years, and the implied difference in "intelligence" is presumably also to be found in their parents. We feel that the R.G. classification, the type of school, and the assessed parental care should be regarded merely as different indices of the care given to the welfare of the child.

Bed-sharing.—A relationship, if any, with bed-sharing needed to be separated from the factors shown above to be associated with stature. Therefore (1) the mean was found for all boys who shared beds, and (2) this was "matched" by a mean made up of boys who did not, but were otherwise identically placed as regards the environmental factors noted above. The mean of 100 boys who shared beds was 45.6 kg.; the figure for the matched mean was 47.8. Formal tests of significance could not be applied to this difference because of the complexity of factors concerned, but the difference is large and showed up with great consistency throughout the process of analysis. We therefore think that it is real.

Open Surroundings.—Sixty-three boys who lived in the heart of Bristol were compared with a "matched sample" who had lived almost all their lives in the open surroundings of a modern housing estate. The difference, 1.41 kg. in favour of the latter group, is too small in view of the size of the sample to enable an inference to be drawn.

"Broken Homes."—Twenty-eight boys from broken homes had a mean weight of 48.7 kg. as compared with a mean of 48.5 kg. for a matched sample from unbroken homes. This sample is small, but we may add that we were also unable to demonstrate any difference in this respect in either Kingston or Salford.

"Mother Goes Out to Work."—The mean weight of 105 children whose mothers went out to work was 49.8 kg. That of a matched sample was 47.0 kg., a difference so great as unlikely to be a "chance" occurrence. In the case of boys from modern schools it was permissible to make a direct comparison without resorting to matching, because there was little difference between the mean weights of R.G. groups in modern schools. In the modern schools, 65 boys whose mothers went out to work had a mean weight of 48.9 ±9.33 kg., compared with 145 boys with mean weight 45.8 ±8.13. These differences are statistically significant.

Independence of Dietary and Other Factors

The mean weight (kg.) of grammar-school boys on "poor," "average," and "good" diets was 47.6, 50.3, and 52.0 respectively. For modern schools it was 46.1, 46.4, and 48.1. The corresponding figures for good parental care were 48.5, 51.6, and 52.1, compared with 46.6, 46.4, and 48.4 for average parental care. For R.G. I and II they were 49.0, 52.7, and 54.0, compared with 46.9, 47.0, and 50.0 for R.G. III, IV, and V combined. Whatever the social criterion used, those assessed as "good" stand well above their fellows of the corresponding dietary pattern. The data above are for consumption of meat and fish. The other dietary indices gave a similar picture.

Discussion

Physical Findings

This work confirms the report of Weir that where the stature of children has increased the physique is slimmer. The findings on puberty are in harmony with those cited by Stuart upon the effect of good social conditions in accelerating the onset of puberty.

The differences between Salford and Kingston are similar in character to those between the different social groups in Bristol. This, we hold, extends the implication of Weir's work comparing secular change and social differences.

Environmental Factors

Certain negative points are best cleared up first. We adduce no evidence that mental stress affected the stature of our groups; in fact, one of our "stresses" was associated with exactly the opposite result. We cannot say whether residence in open surroundings confers any advantage over residence in the heart of a city, for the fact that the difference found was small does not mean that it may not have been real. Whether the association between weight and bed-sharing was in fact causal could only have been proved by the provision of beds.

The inquiry was not designed to throw light on the effect, in after years, of environmental conditions affecting the growth in early childhood, and some of the contrasts in weight that we have recognized may simply be the result of factors which operated then. For example, there was little difference in the dietary pattern of boys whose mothers worked and of those whose mothers did not work, but it does not follow that differences did not exist in early years, particularly if those having working mothers were left for any part of their pre-school life in the nutritionally excellent environment of a day nursery.

The association between dietary pattern and weight shown in this study does not support the hypothesis put forward at the outset concerning the adequacy of schoolboys' diets. There are, of course, possibilities other than the obvious one. (1) The "poorer" diets may be adequate for growth at 14, but boys on them may also have lived on poorer diets earlier when their rate of growth was relatively greater. (2) Since the provision of a varied diet is a function of a good parent, it may be that we are merely recording degrees of parental care which were not shown up by the social criteria which we used in this study.

The relation, at all dietary levels, between weight and "very good" and "normal" parental care is reminiscent of Widdowson's demonstration of the influence of the motherly matron on the orphans in her care. Here too, however, other possibilities exist, because our dietary criteria are not exact, nor do they provide information about the diet at other seasons or earlier in life.

The problems raised in this study would not have been resolved had the same approach been used but with greater detail and exactitude. For example, even using the conventional (and costly) method of dietary survey, doubt would have arisen whether any association found between growth and diet was in fact causative. This study suggests that non-dietary factors cannot be ignored as a potential cause of checks to growth, and further progress in this direction would seem to depend upon the development and testing of working hypotheses on how such factors may operate. Presumably they either act "centrally"—for example, through the endocrine system (in which case, for lack of knowledge, no guess can be hazarded regarding the way in which they work)—or there is some disturbance in the equilibrium between intake and the needs of energy and of growth. From clinical studies in time of hunger, and from animal experiments, notably by Young (1945) and by Greenbaum and Maclean (1953) it may be concluded that under certain conditions competition between growth and energy requirements does occur. There is, too, some evidence that this may occur in everyday life. For example, Macy and Hunscher (1951) have reported that for some children the voluntary intake level is not sufficient for "satisfactory" weight gain or nitrogen retention, and that these may be secured by increases of total intake of 10 calories per kg. body weight. Similarly, Hubbell and Koehne (1934) report improved nitrogen, calcium, and phosphorus retention in children whose calorie intake was increased 16–18% by the addition of sugar.

The finding of Yudkin (1952a) that pallor was related to poor development (but not to haemoglobin level), which we confirm in respect of weight, is of interest in this connexion, for pallor is an early sign of undernutrition. A possible explanation is that over long periods of life the

equilibrium between growth, activity, and appetite is set at a low level, owing to some factor affecting the last of these. Whether "undernutrition" of this nature could affect growth without effect on the surface fat, or with such small changes only as we have reported, is unknown; it is not the sole, and may not even be the prime, function of the surface fat exactly to make good deficits of intake.

There are, as already noted, long-term growth studies in progress, some of them on the general public. The practical value of these will depend in part upon the success with which the factors affecting growth are recognized at the time and their intensity is gauged. This is impossible in the case of non-dietary factors without working hypotheses regarding their *modus operandi*. Hence these considerable speculations. We would suggest, among such hypotheses, that such things as a varied and tempting diet, adequate sleep, and regular bowel habits, and similar attention to the fitness of the child, may affect appetite and therefore growth rate.

Summary

Recent published evidence on schoolboys' diets and stature has been reviewed. Possible reasons for the differences in stature which still persist are discussed, and a field study of a reconnaissance character is described.

The findings confirm the report by Weir (1952) that increase in growth rate is associated with slimmer physique.

Differences in physique between boys in an industrial area and others elsewhere are similar to the differences in boys of different socio-economic environment.

Boys with pallor were found on average to be lighter, confirming a part of Yudkin's (1952a) findings on the significance of pallor. Thin boys were found to be lighter and also shorter than others. The possibility that these findings mean that in some individuals growth is checked because appetite is inadequate is discussed in the light of American work.

Varied diets, as indicated by frequency of consumption of meat and fish, milk, and fruit, were found to be associated with higher weights.

There was a relationship, independent of the association between weight and diet, between weight and the standard of parental care, social class, and type of school.

We wish to express our gratitude to the Medical Officers of Health of Salford, Kingston, and Bristol for their help. We are much indebted to Miss C. M. Wood, Dr. R. J. Irving-Bell, and Dr. A. M. Fraser, of the Bristol Public Health Services, and to many health visitors, school nurses, and others in the three areas for their kind collaboration.

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ENTERIC PNEUMATOSIS

BY

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Enteric pneumatosis is characterized by the occurrence of gas-containing cysts, either sessile or pedunculated, arising in the submucous and subserous layers of the small intestine. They attain the size of a grape and tend to appear in local masses, which in turn may be multiple. They are classically more common on the mesenteric aspect of the bowel and are confined to the small intestine and proximal half of the large intestine.

These cysts are similar in appearance to lymphangiomata, having a thin translucent wall, and are composed of delicate connective tissue lined, at least partially, by endothelium and with evidence of giant-cell formation. The entire microscopical appearance supports the view that the longevity of these cysts is not so much the result of their own perpetuity as of continual replacement due to some influence not understood. The contents are gaseous, being composed mostly of nitrogen with smaller proportions of oxygen and occasionally carbon dioxide, hydrogen, and methane.

Theories on the Cause

Various theories of the evolution of this condition have been expounded, and Masson (1925) has examined these in some detail. It has been thought that these collections of gas are caused by gas-producing organisms, but experiments have failed to produce a similar condition. Further work has been done to investigate possible penetration of intestinal mucosa, associated with increase in intestinal pressure such as may occur in vomiting, coughing, or constipation, but this theory in turn has been disproved, as the cystic gas has not shown the same constituents as intestinal gas.

It is now accepted that this condition is in fact one of gaseous dilatation of lymphatic channels. Masson has investigated the causation of this phenomenon, and concludes that the fundamental pathology lies in lymph stagnation in tortuous or obstructed lymph vessels. He further states that absorption of carbon dioxide and lactic acid from the intestinal mucosa occurs into blocked lymphatics, and that this is followed by liberation of the carbon dioxide, and by diffusion of nitrogen, oxygen, and occasionally methane from capillaries; the resultant ratios of the gases being adjusted by the laws of diffusion governing the partial pressures of gases.

Masson and others have suggested that enteric pneumatosis occurs in association with digestive disturbances, and especially those due either to gastric or to duodenal ulceration, although the cause for this is not clear. Various other authors assert that it is associated with such conditions as intestinal tuberculosis, acute and chronic appendicitis, colitis, and many others, but these seem to be purely coincidental.

Koss (1952), in a review of the literature, has noted the clinical course of this disease. He asserts that the disease may develop within a relatively short time, as confirmed by operative findings. There is also considerable evidence to show that these cysts may disappear spontaneously, but certain complications have been noted. Pneumoperitoneum may occur owing to spontaneous rupture of the cysts, but intestinal obstruction seems to be the most likely complication. The obstruction may be precipitated by blockage of the bowel lumen by submucous cysts, by volvulus induced by a cyst mass, or by extrinsic obstruction due to pressure by cysts or adhesions arising as a result of the condition. Koss reported one case of intussusception due to gas cysts.

This disease has been described as occurring in the vagina during pregnancy, and the first, albeit inadequate, descrip-

tion of its occurrence in man is claimed by English authors to be that of John Hunter (1728–93) and by French authors to be that of Duverney (1648–1730).

In 1825 Mayer described a case occurring in the intestine and peritoneum of a pig, but the first full account of the disease in humans is attributed to Bang (1876), who found this condition at necropsy in a female who died of volvulus of the colon. In 1899 came the first report of the condition by Hahn, who found it in the living subject. Since that time, according to Koss, who has reviewed the available literature very fully, 213 cases have been reported, the vast majority from Central Europe.

A further case, reported below, shows the classical features as described, with the exception that the condition was found to be present in the distal colon—a rare site in a rare disease.

Case History

A married woman aged 49 was first seen in January, 1952, complaining of the passage of bright red blood intermittently on defaecation and associated with diarrhoea and lower abdominal pain. The pain was not severe, but the whole syndrome had been present for 18 months. She had no other complaints apart from long-standing constipation before the onset of the present symptoms, and her weight was steady at about 11 st. (70 kg.). Her previous history contained nothing relevant—an appendicectomy at the age of 19 and hysterectomy at 39. She had been a chronic sufferer from asthma.

Showing filling defects in sigmoid colon and splenic flexure due to gas cysts.

She was admitted to hospital, and, apart from some deep tenderness in the left iliac fossa and a minor degree of haemorrhoids, nothing abnormal was found on either abdominal or rectal examination. Her blood picture was normal. Sigmoidoscopy was performed and the bowel was normal to 23 cm. At this level several polypoid masses were seen filling the lumen of the colon; these were sessile, and measured from 0.5 to 1.5 cm. in diameter. The surface was translucent and of a bluish hue, the appearance being more like that of lymphangiomatosis than polyposis. There was some evidence of recent haemorrhage from the surface of the cysts.

Examination by a barium enema showed rounded translucent filling defects in the sigmoid colon and the splenic flexure (see Fig.). It was decided to perform laparotomy to elucidate further the diagnosis and the extent of the involvement of the bowel.

On opening the lower abdomen the diagnosis was at once evident. Masses of gas cysts were found, involving 6 in. (15 cm.) of a redundant sigmoid colon and 4 in. (10 cm.) of the splenic flexure and distal transverse colon with a normal descending colon between. These cysts presented a similar appearance to that seen at sigmoidoscopy and were aggregated around the entire circumference of the bowel but stopping short of the mesentery. No other abnormality was demonstrated in the abdominal cavity. In view of the symptoms, it was decided to excise the distal colon, and this was performed with end-to-end suture of the transverse colon stump to the pelvi-rectal junction.

Convalescence was uneventful and the patient was discharged from hospital 12 days later free from symptoms. When seen at the out-patient department two months later she had fully recovered from her operation, and her bowel action was normal and her pain and bleeding had gone.

Pathological Report.—"The specimen consists of distal transverse colon, splenic flexure, and descending and sigmoid colon, and shows the typical submucous and subserous gas-filled cysts. The phenomenon of 'skipping' is well illustrated. Microscopically the cysts bear evidence of an endothelial lining with commencing giant-cell formation. No portal of entry for the 'air' has been demonstrated in the colon."

Conclusions

Enteric pneumatosis is a condition in which the intestinal lymphatic channels become blocked and distended by gas, producing multiple gas cysts both subserous and submucous in position.

The condition occurs mainly in men between the ages of 30 and 50, is accompanied by vague digestive and abdominal symptoms, and would appear to be subject to spontaneous resolution. Intestinal obstruction has been pointed out as the most likely complication.

The case reported above is of interest apart from the rarity of the condition in that barium enema and sigmoidoscopic evidence of the disease was found and had not previously been reported in the literature.

The distribution of the cysts in this case seems to differ from that of cases previously noted, and the all-important symptom of haemorrhage on defaecation led the patient to seek medical advice.

I wish to thank Dr. W. MacCullagh Wilson, of the Coventry and Warwickshire Hospital, for his help with the pathological investigation of the specimen.

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ULCERATIVE COLITIS AND CARCINOMA OF THE LARGE INTESTINE

BY

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That ulcerative colitis apparently predisposes to cancer of the colon or rectum seems now to be widely accepted Upon the correct assessment of this risk the whole therapeutic policy towards the disease might well depend. I have been unable to find any report in which such cancer risk has been estimated, although there are many papers which record the occurrence of this complication of colitis.

The purpose of this communication is to report a further five cases of malignant disease of the intestine arising in the course of colitis, and to consider these cases, in conjunction with reports by other authors, in an attempt to estimate the cancer risk.

Clinical Material

Between January 1, 1947, and December 31, 1951, 154 patients with the diagnosis of idiopathic ulcerative colitis were admitted to St. Bartholomew's Hospital under the care of the physicians and surgeons and to the Gordon Hospital under Dr. E. R. Cullinan's care.

Three of these have gone abroad; their fate is unknown, and they have not been included in the discussion which follows. A further 25 have been excluded from the series on the grounds of incomplete investigation and uncertainty of diagnosis. No case of proctitis without evidence of colonic involvement has been included.

Table I gives the age and sex distribution of the remaining 126. Table II shows the result of a combined postal and personal-attendance follow-up by January 1, 1953. Table III sets out the period for which each patient has been under surveillance since January 1, 1947, with additional information concerning the recognition of cancer of the bowel. In this Table the follow-up is recorded as finishing if colectomy is performed, as, of course, cancer of the large intestine can no longer occur. Table IV classifies the patients according to duration of the disease.

In addition to the five cancer cases recorded here, it should be stated that a further four cases have occurred in the period under review. These have been excluded from the current study because, the diagnosis of cancer having been made elsewhere, the patients were referred to us for treatment of the growth.

TABLE I.—*Age (in 1952 or at death) and Sex Distribution. The Ages at Which Cancer of the Large Intestine Appeared are Shown*

Age Group	Male	Female	Total	Cancer Diagnosed
0–14	0	0	0	
15–19	4	2	6	
20–24	2	2	4	
25–29	13	11	24	1
30–34	4	17	21	
35–39	7	11	18	
40–44	11	9	20	1
45–49	3	5	8	
50–54	5	7	12	2
Over 55	4	9	13	1
Total	53	73	126	5

TABLE II.—*Results of Follow-up*

Alive		Dead		Not Traced	Total
No Known Cancer	Has Cancer	No Known Cancer	With Cancer		
98	1	19	4	4	126

TABLE III.—*Cases Grouped According to Length of Follow-up. The Last Column is Obtained by the Assumption that the Patients on the First Line have Been Followed-up for an Average of Six Months, Those on the Second Line for One and a Half Years, and So On*

No. of Years of Follow-up Completed	No. of Patients	Follow-up Ended by Colectomy	Follow-up Ended by Death	Large-gut Cancer Found	Approx. No. of "Patient-Years"
0	25	8	11	2	12½
1	12	7	5	0	18
2	28	4	2	0	70
3	28	3	3	2	98
4	14	2	2	1	63
5	19	0	0	0	104½
			Total patient-years ..		366

TABLE IV.—*Distribution of Cases According to Duration of Symptoms*

Duration of Symptoms to Date, till Death, or till Colectomy	Total No. of Cases	History Ended		Carcinoma Found
		By Colectomy	By Death	
0–4	30	9	6	
5–9	50	9	7	1
10–14	21	4	2	1
15–19	12	1	3	1
20–24	8	1	2	
25–29	4	0	2	1
30 and over	1	0	1	1

Case Reports

Case 1.—A 51-year-old housewife was referred to St. Bartholomew's Hospital in October, 1949, because she had had bloody diarrhoea for 20 years, with slight remissions. Medical in-patient treatment in other hospitals had helped her little. Physical examination revealed a mobile tender swelling in the left hypochondrium, and this was shown radiologically to be a colonic neoplasm, the rest of the colon showing the changes of ulcerative colitis. Total colectomy and ileostomy were performed. The operation specimen showed a carcinoma in the left half of the transverse colon, with the characteristic changes of chronic ulcerative colitis affecting the whole of the remainder of the colon. Histologically, the growth was described as "moderately anaplastic" and one out of 27 lymph nodes was infiltrated with carcinoma cells. In 1953 she was free from recurrence of growth, and plans for ileo-rectal anastomosis were being considered.

Case 2.—A 26-year-old unmarried carpenter was first seen at St. Bartholomew's Hospital in 1935, with a two-year history of bloody diarrhoea. Sigmoidoscopy showed the changes of ulcerative colitis, but the colon was not *x*-rayed. Appendicostomy was performed, with temporary improvement. This closed spontaneously two years later. Remissions and relapses continued until 1945, after which he became well for two and a half years. In August, 1949, he reported the appearance of alternating constipation and diarrhoea, with small stools. Barium enema revealed a carcinoma at the junction of the descending and pelvic colon, with chronic colitic changes above the growth. Exploration confirmed the presence of the growth, but numerous peritoneal metastases were seen, and no curative treatment was possible. No biopsy was taken. Palliative caecostomy was performed, and death occurred five months later. Necropsy was not permitted.

Case 3.—A married clerk aged 50 was referred to St. Bartholomew's Hospital by his doctor in February, 1949. He had had bloody diarrhoea from 1918 intermittently until 1922, when a caecostomy was performed. Thereafter there were a number of minor relapses of the colitis symptoms, and a very severe one. For several years a prolapsed caecum had been troublesome, and because of this he was sent to this hospital. Examination showed the rectum to be greatly stenosed; right hemicolectomy and ileostomy were carried out; the left colon was to have been removed later. The operation specimen showed the appearances of ulcerative colitis throughout its length, but not spreading to the ileum. He remained well until May, 1950, when left iliac pain and abdominal distension appeared. A mass could be felt in the abdomen, and laparotomy revealed a large carcinoma of the descending colon, with many peritoneal metastases. Biopsy showed a mucoid adenocarcinoma. He returned home and died in January, 1951. No necropsy was performed.

Case 4.—A married woman, aged 63, was referred to the Gordon Hospital by her doctor in April, 1951, with a history of bloody diarrhoea intermittently since 1925, more continuous since a severe relapse in 1935. In 1935 ulcerative colitis was diagnosed, and after eight months' hospital in-patient treatment she had to some extent improved. Symptoms remained troublesome, but six months before we saw her she became much worse, with 20 to 30 bowel actions a day and much blood and mucus. On examination she was found to have a carcinoma of the rectum, and laparotomy revealed peritoneal metastases. She died on the eighth post-operative day. *Necropsy report:* Carcinoma of rectum of mucoid type, peritoneal secondary deposits, severe generalized ulcerative colitis: confirmed histologically.

Case 5.—A married woman aged 25 first attended at the Gordon Hospital in August, 1949, with a six-year history of bloody diarrhoea for which she had had three previous periods of in-patient treatment at other hospitals. Barium enema and sigmoidoscopy showed the typical appearances of ulcerative colitis throughout the colon. After six weeks' in-patient medical treatment she was much improved. For two years she was fairly well, but in September,

1951, she reported a lump in the breast, an abdominal mass, and pain in the chest. Laparotomy revealed carcinomatosis peritonei, and she died two weeks later. *Necropsy report:* primary colloid cancer of the transverse colon, with generalized metastases; the whole colon was affected by extensive and severe ulcerative colitis, without spread to the ileum. The diagnosis was confirmed histologically.

Discussion

During the period of observation of 126 patients with ulcerative colitis, five cases of carcinoma of the rectum or colon have been found. That this is not an unusually high proportion is suggested by other reports. Rice-Oxley and Truelove (1950) found 4 cases out of 129; Counsell and Dukes (1952) discovered 7 cases with this complication in a group of 63; Lyons and Garlock (1951) reported that 9 in their series of 226 showed malignant change; Dennis (1945) noted 2 certain cases and 1 probable case of bowel cancer in his series of 82 cases of colitis; Kirsner *et al.* (1948) reported 2 in a selected group of 100; Lahey (1949) found 17 in a series of 600; Brown *et al.* (1951) found 7 in 147; and Sloan *et al.* (1950) reported 109 cases of intestinal malignancy in a group of 2,000 cases of ulcerative colitis.

Earlier papers (Feder, 1938; Willard *et al.*, 1938; Hurst, 1935) do not record this complication. Up to 1945 Lynn, in his review of the literature on this subject, found that 98 cases had been reported, and he stated that by collecting the reported series together he found that 28 cases had arisen in 1,467 patients with colitis. In a more recent paper Felsen and Wolarsky (1949) reported that they had found no cases of intestinal malignant disease in a study of 855 patients with ulcerative colitis. It is difficult to reconcile the negative findings of the last-named with the recent reports from so many other centres. Nevertheless, even including this series, the average ratio of cancer to total cases in the post-war reports is about 3.7%.

Most clinicians would feel that this figure is so small as to have little weight in the decision whether a particular patient should have his colon removed. It is important to recognize, however, that this figure does not represent the chance of a patient *eventually* developing cancer of the diseased intestine, but only the cancer incidence over a particular time—in the majority of reports an unspecified time. If, for example, all the patients in the accumulated series had been observed for an average of 10 years each, 3.7% incidence represents 3.7 cases for every 100 of the population at risk, during a period of 10 years, or 3.7 per 1,000 living per year.

In England and Wales in 1950 (Registrar-General, 1952), 16,389 deaths were registered as being due to neoplasm of the colon and rectum. A guess that this represents an annual incidence of 20,000 new cases cannot be very wide of the mark. A negligible number of these occur below the age of 25, and the population over that age in 1950 was 28¼ million. This gives an annual incidence in the population of England and Wales over the age of 25 of 0.7 per 1,000 living. The estimated annual incidence in the U.S.A. is 0.88 per 1,000 (Bargen, 1949).

So that, by our quite generous guess that every patient in all these reports has been followed up for an average period of 10 years, we derive the result that cancer of the rectum and colon in these cases is five times more common than among the population as a whole.

If we apply the same principle to the much smaller group formed by my own cases we obtain the figure of 366 patient-years (Table III) in which five carcinomas have occurred—an annual incidence of 14 per 1,000, or twenty times the national figure. This calculation is unsatisfactory because of the extremely small number of cases. It is worthy of note, however, that the small group here reported closely follows the pattern of other accounts. Thus the proportion of cancer cases to colitis cases is very close to the average figure of the other reports: the relatively youthful incidence of cancer in this site as compared with the commonest ages in the whole population is commented on by others (for example, Sauer and Bargen, 1949); that the growths appear especially in those who had had colitis for many years (Lahey, 1949; Counsell and Dukes, 1952) is borne out in our series, in which four out of the five cancer patients had had colitis for 15 years or longer.

This method of assessing the cancer morbidity in the present series as compared with the general population is, for lack of data, crude and involves a good deal of guesswork. It is not possible, with the information at my disposal from other publications, or with the small numbers in my series, to analyse these figures with greater refinement. It seems reasonable to deduce that in the reports I have quoted carcinoma of the rectum and colon has occurred at least five times as often as one would have expected if they had been a sample of the normal adult population.

Conclusions

The fallacy of reporting an "incidence" in the neighbourhood of 4% without reference to time has been illustrated. It would appear that such an incidence represents a cancer risk to these patients which is many times that for the "average" person. Cancer of the rectum and colon in the general population is by no means a rare disease (being responsible for 1 in 30 of all deaths), and a possible fivefold increase in our patients is therefore no mere academic observation. One feels that until long-term study has produced more cases and an opportunity for more exact examination of survival times and cancer incidence, the increased risk of malignant disease in the rectums and colons of these patients should be held to be an important factor when the question of surgical intervention is being considered.

Summary

Five cases of carcinoma of the large intestine occurred in 126 cases of ulcerative colitis. Case reports of the carcinoma cases are presented.

An attempt is made to assess the cancer risk for this site in ulcerative colitis, with reference to this and other reported series.

It is suggested that the cancer risk for this site in patients with ulcerative colitis is not less than five times that for the population as a whole.

ADDENDUM.—Since this paper was written, the workers at the Mayo Clinic have published an analysis of cancer mortality in a series of 1,500 cases of ulcerative colitis. They conclude that carcinoma of the rectum and colon is 20 to 30 times commoner as a cause of death in this disease than in the population as a whole (Bargen, J. A., Sauer, W. G., Sloan, W. P., and Gage, R. P., *Gastroenterology*, 1954, **26**, 32).

I am greatly indebted to Mr. Basil Hume for permission to report Case 1; to Sir James Paterson Ross for Case 2; to Mr. J. P. Hosford for Case 3; and to Dr. E. R. Cullinan for Cases 4 and 5. The staff of the follow-up departments at St. Bartholomew's Hospital and the Gordon Hospital have been of tremendous help in tracing the patients. Dr. Cullinan has given me much valuable advice and encouragement, and Mr. M. P. Curwen, medical statistician at St. Bartholomew's Hospital, has been most helpful with his kindly criticism.

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ASSOCIATION OF DIABETES MELLITUS WITH CEREBRAL TUMOUR

BY

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Ashby and Tweedy (1953) stated that "no neurogenic lesion causing permanent diabetes has been described," and they added that numerous cerebral lesions are known to cause transient hyperglycaemia, but not permanent diabetes. In view of this we are prompted to record the following case.

Case Report

A 51-year-old lorry driver was sent to the out-patients department on April 6, 1951, with symptoms of polydipsia and polyuria which he had had for three months; he had lost a good deal of weight in spite of an excellent appetite. There was no family history of diabetes.

Examination showed a well-built man, not obese, who was thought to be rather slow mentally, though co-operative. He had a thickly furred, dry tongue, and was moderately arteriosclerotic, but all peripheral pulses were palpable. The blood pressure was normal. Fundi and media were clear and all reflexes were brisk and equal, with normal power and sensation in the limbs. The urine was acid, specific gravity 1028, and orange to Benedict's reagent; there was no acetone or albumin. A glucose-tolerance test showed a diabetic curve (see Chart), and the patient was admitted a week later for stabilization. The above findings were confirmed, but in addition the ankle-jerks were now absent and the right knee-jerk was weak. There was some subjective difficulty in using the left leg, and both calves were tender.

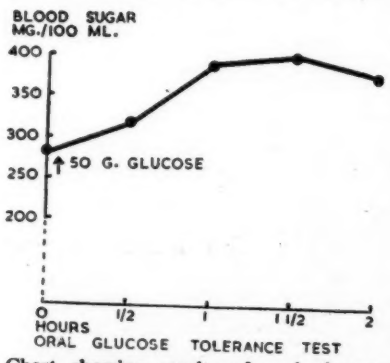

Chart showing results of oral glucose-tolerance test.

He was placed on a 200-g. carbohydrate diet and was finally allowed out of hospital on April 30 on two injections of 48 and 24 units of soluble insulin daily. During his stay in hospital his diabetes was difficult to stabilize and the urine contained acetone on occasion. His weight remained steady and he felt better, though he was still rather slow in cerebration. He was seen in the clinic two weeks later, before going to a diabetics' convalescent home, when he seemed well, though complaining of some weakness in the right leg. On return from convalescence at the beginning of June, however, he was not at all well, appeared increasingly slow mentally, and had difficulty in getting about.

He was readmitted the next day, when he was found to have weakness of both quadriceps and foot extensors, with absent tendon reflexes. The plantar responses were flexor. His feet felt numb, but there was no objective sensory loss, except to light touch in the left palm, where the grip was poor. The fundi were normal. There were crepitations at the bases of the lungs, but no evidence of congestive failure. A diagnosis of peripheral neuritis was made, and he was treated with injections of vitamin B_1 and physiotherapy. A chest radiograph was normal. The Wassermann reaction and Kahn test were negative. A lumbar puncture revealed normal fluid under a pressure of 220 mm., with a protein content of 20 mg. per 100 ml. His condition deteriorated rapidly and he became increasingly comatose. Eleven days after admission he was found to have regained his tendon reflexes in the legs and the left plantar response had become extensor. There was no papilloedema. A left hemiparesis developed, and he died in coma with hyperpyrexia 10 weeks after first attending hospital. His urine during the last period of admission still contained moderate amounts of sugar and acetone, but the blood sugar the day before death was normal.

At necropsy (Dr. T. Goodier) a large glioblastoma multiforme, containing mainly spongioblast-like cells, was found in the left temporal region, spreading down into the hypothalamus, but not involving the pituitary. The pancreas showed degenerative changes compatible with diabetes mellitus. There were no other gross findings.

Discussion

Since Claud Bernard (1849) produced glycosuria by puncture (piqûre) of the floor of the fourth ventricle in animals, repeated attempts to define a cerebral centre concerned with carbohydrate metabolism have yielded conflicting results. The centres for piqûre glycosuria are now thought to lie in the hypothalamic nuclei in the walls and floor of the third ventricle, but most authors agree that experimental damage to this region causes transient hyperglycaemia and glycosuria only, and that thereafter the blood sugar returns to normal or low normal figures (Long, 1940). Ranson *et al.* (1938) recorded the production of diabetes in only one of 50 monkeys and in none of 300 cats with hypothalamic lesions, and thought that the disturbance in carbohydrate metabolism in their one animal was related to obesity and overeating. No other worker has reported the production of permanent diabetes in the experimental animal.

Clinically, it is well known that cerebrovascular accidents, cerebral trauma, meningitis, and tumours may cause transient hyperglycaemia and glycosuria. Cushing (1930), however, stated that he had never seen even transient glycosuria after operations in the hypothalamic region. Joslin *et al.* (1952) also quite clearly subscribed to the view that there is no justification for assuming a cerebral role in the aetiology of diabetes mellitus, and that where the two are associated there is a coincident hereditary weakness of the pancreas. Nevertheless, van Bogaert (1928) mentioned two patients with tumours of the third ventricle, with hyperglycaemia and diabetic sugar-tolerance curves. The pancreas was normal in one case at necropsy. Byrom and Russell (1932) gave a detailed account of a woman with an insulin-resistant diabetes, who was found to have an ependymal cyst of the third ventricle. There was, however, a strong family history of diabetes, but they suggest that hypothalamic irritation may lead to hyperglycaemia through overactivity of the sympathetic nervous system, and eventually to diabetes. Penfield (1934) also mentioned a patient with insulin-resistant diabetes of five years' duration in whom a cyst of the mid-brain was found at necropsy.

In the present case the association of diabetes mellitus with the cerebral tumour seems inescapable. The short history, the absence of any hereditary predisposition, and the insulin resistance are points in favour of this. The retarded mental state was a striking feature, though there were no other hypothalamic symptoms. The mechanism of production of the diabetes, however, is difficult to explain.

There seems little doubt that the hypothalamus is concerned in the emergency regulation of the blood sugar through its control of sympathetic-parasympathetic pathways. If this control is upset hyperglycaemia might result from sympathetic overactivity; the hyperglycaemia would act as a stimulus to increased insulin production and might lead to eventual exhaustion of the β-cells of the pancreas. Permanent diabetes has been produced in animals by long-continued hyperglycaemia (Dohan and Lukens, 1947). Alternatively, parasympathetic overactivity might increase insulin production through vagal stimulation of the pan-

creas, which again might lead to islet atrophy and permanent diabetes. The evidence for vagal control of insulin secretion, however, is not very clear-cut (Long, 1940). With either hypothesis, the finding of changes in the pancreas at necropsy does not necessarily implicate that organ as being primarily responsible for the diabetes.

In conclusion, experimental and clinical evidence suggests that the production of diabetes mellitus by hypothalamic damage is exceptional. Nevertheless, the hypothalamus seems to play some part in the regulation of carbohydrate metabolism, and its role is worthy of further study.

Summary

A case is described in which diabetes mellitus of recent onset was associated at necropsy with a neoplasm in the region of the hypothalamus.

It is suggested that the cerebral lesion was responsible for the onset of diabetes.

Experimental and clinical evidence gives some support to the view that the hypothalamus is concerned in the regulation of carbohydrate metabolism.

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SYSTEMIC ANTIBIOTICS IN CERTAIN DERMATOSES

TRIAL CONDUCTED UNDER THE AUSPICES OF THE MEDICAL RESEARCH COUNCIL

Under the auspices of the Medical Research Council clinical trials were undertaken at St. John's Hospital for Diseases of the Skin* in order to evaluate the effect of the newer antibiotics when given systemically for certain chronic, recurrent, and resistant skin conditions. This trial was under the direction of Dr. J. O. Oliver (director of pathology) and was regarded as a "pilot" survey to indicate whether subsequent large-scale trials would be of value.

The trials were designed for use with out-patients, the antibiotics under scrutiny being aureomycin, chloramphenicol, and oxytetracycline ("terramycin"). For control purposes dummy capsules were prescribed to a second group of patients, and it was arranged that neither the doctor nor the patient knew which medicament was being given. Dosage used for the antibiotic was 2 g. a day, taken in four divided doses, and the treatment was continued for three weeks unless the patient was forced to stop because of side-effects. A compound vitamin-B tablet was taken with each capsule. All cases which did not complete three weeks' treatment were regarded as failures. The observed results (see Table) were as follows.

Disease and Drug Used in Trial	Total	Cured	Improved	Unchanged	Failed to Complete Course	Observed Effect
Herpes simplex recurrens	31					
Chloramphenicol	12	0	0	12	4	Nil
Aureomycin	6	0	0	4	2	Nil
Oxytetracycline	5	0	0	3	2	Nil
Controls	8	0	0	8	0	Nil
Plantar warts	30					
Chloramphenicol	8	3	—	3	2	Nil
Aureomycin	9	1	—	1	7	Nil
Oxytetracycline	4	2	—	0	2	Nil
Controls	9	6	—	3	0	Nil
Lichen planus	19					
Chloramphenicol	7	0	1	4	2	Nil
Aureomycin	5	0	1	2	2	Nil
Oxytetracycline	3	0	1	2	0	Nil
Controls	4	0	3	1	0	Nil
Pityriasis rosea	25					
Chloramphenicol	8	0	0	8	—	Nil
Aureomycin	8	0	0	8	—	Nil
Oxytetracycline	3	0	0	3	—	Nil
Controls	6	0	0	6	—	Nil
Dermatitis herpetiformis	12					
Chloramphenicol	3	0	1	1	1	Nil
Aureomycin	4	0	0	2	2	Nil
Oxytetracycline	3	0	0	0	3	Nil
Controls	2	0	0	2	0	Nil
Discoid eczema	16					
Chloramphenicol	6	0	0	4	2	Nil
Aureomycin	5	0	1	2	2	Nil
Oxytetracycline	2	0	0	1	1	Nil
Controls	3	0	1	2	0	Nil
Seborrhoeic infective eczema:						
Short duration	7					
Chloramphenicol	4	4	—	—	—	Marked benefit
Aureomycin	2	2	—	—	—	Marked benefit
Oxytetracycline	1	1	—	—	—	Marked benefit
Controls	0	0	—	—	—	Marked benefit
Long-standing:	7					
Chloramphenicol	3	0	—	3	—	Possible benefit
Aureomycin	3	1	—	2	—	Possible benefit
Oxytetracycline	1	1	—	0	—	Possible benefit
Controls	0	0	—	0	—	Possible benefit

1. *Herpes simplex recurrens* (31 cases, including 8 controls). No effect in preventing recurrence was observed as the result of the administration of aureomycin, chloramphenicol, or oxytetracycline. One case relapsed under active treatment.

2. *Plantar warts* (30 cases, including 9 controls). No indication of superiority of any of these antibiotics over the dummy capsules. In fact, in the control series six patients recovered out of the nine, substantiating the well-known observation that warts are unpredictable in their behaviour.

3. *Lichen planus* (19 cases, including 4 controls). No apparent effect was noticed.

4. *Pityriasis rosea* (25 cases, including 6 controls). There was no apparent reduction in the duration of the condition as a result of administration of any of the antibiotics.

5. *Dermatitis herpetiformis* (12 cases, including 2 controls). Although this series was small no indication was given that any of the antibiotics exerted a favourable effect.

6. *Discoid eczema* (16 cases, including 3 controls). No apparent effect was detected.

7. *Seborrhoeic infective eczema* (patients with red oozing scalps and faces with crusting, scaling, and fissuring of the ears). These were divided into two groups: (*a*) *Of short duration* (7 cases, with no controls). All seven patients made a rapid and uninterrupted recovery. (*b*) *Long-standing cases lasting for months or years* (7 cases, with no controls). Two apparently recovered but five were unaffected.

Summary

From the small number of patients treated it would appear that the use of aureomycin, chloramphenicol, and oxytetracycline, when given systemically, is not indicated for herpes simplex recurrens, plantar warts, lichen planus, pityriasis rosea, dermatitis herpetiformis, or discoid eczema. It would seem, however, that in infective seborrhoeic eczemas of recent origin, in which one must regard an infective process as being superimposed on a readily infectable soil, rapid results are often obtained by the use of these antibiotics. It also became apparent that the use of large doses of these antibiotics on ambulant patients may cause such unpleasant side-effects (nausea, vomiting, and gastro-intestinal upsets)—particularly so when aureomycin is being used—as to make such treatment impracticable.

Our thanks are due to Miss H M. Tedham, pharmacist, for her assistance.

*The medical registrars responsible for this trial were Drs. R. H. Seville, C. D. Calnan, R. H. Meara, and J. H. S. Pettit. Dr. P. D. Samman undertook the lichen planus series.

Medical Memorandum

Carcinoma of the Pancreas in a Girl of 16, Presenting as Carcinomatosis of Lungs

The following case is of interest owing to its unusual presenting symptoms and to the rarity of the disease at this age.

CASE REPORT

The patient was a girl aged 16 whose father and mother were in a mental hospital. Apart from pertussis at the age of 7 she had kept well, and recently had been working in a toy factory and at a laundry. For the past year she had complained of a dry cough. In July, 1951 (four months before her death), she had measles and had been off work since. Since August there had been increasing tiredness and loss of weight. She became more breathless on exertion and had occasional substernal pain. About November 10 her condition began to deteriorate rapidly. She had a slight evening temperature of 99° F. (37.2° C.) and began to cough up thick white sputum which was never blood-stained.

When examined at home on November 21 she was a pale, wasted, toxic girl obviously breathless, even in bed. The throat was injected, but the tonsils were small. There were no palpable lymph nodes. Tachycardia was pronounced, but the heart sounds were clear. In the chest there was impairment at the right base anteriorly and posteriorly, with harsh breath sounds at the right apex. No added sounds were heard at that time, although her doctor had previously noted scattered crepitations and rhonchi at both bases, particularly the right. The abdomen was soft and no enlarged viscus was felt. An *x*-ray film of the chest showed widespread scattered shadowing throughout both lungs, confluent at the right lower zone—an appearance suggestive of secondary carcinomatosis. The sputum was consistently negative for *M. tuberculosis*.

On admission to the Copthorne Branch of the Royal Salop Infirmary on November 30 it was obvious that she had deteriorated further. She remained pyrexial, with a temperature rising to 102° F. (38.9° C.), and was even more breathless, the respiration rate being 54. She was cyanosed, her cough and sputum had now increased somewhat, and she complained of frontal headaches. The chest expansion was fair, but coarse and fine crepitations were heard all over the chest except at the apices. In the abdomen the liver edge was soft and just palpable. The spleen was also just palpable. A further *x*-ray film of the chest showed the lung fields to be almost completely replaced by multiple opacities, many of which had coalesced. *X*-ray films of the hands, dorsal and lumbar spine, and pelvis were normal.

She became weaker, her cough prevented sleep, and even in an oxygen tent she was breathless and cyanosed. Finally, on December 6 she died from progressive asphyxia.

Clinically, although the case resembled an acute tuberculous bronchopneumonia, the persistently negative sputum and the typical radiological appearances made the diagnosis of secondary carcinomatosis very likely. The site of the primary growth, however, was undetermined.

Post-mortem Examination.—The lungs were found to be consolidated to the shape of the thoracic cage by white and cream-coloured nodules of growth varying in size up to 4 cm. in diameter, so numerous as almost entirely to replace the lung tissue, and so dense as to make the lungs about five times their usual weight. On opening the abdomen the tail and part of the body of the pancreas were found to be replaced by a mass of scirrhous growth about 5 cm. in diameter. Numerous lymph nodes enlarged by metastatic growth were found around the pancreas and aorta, in the mesentery, and in the mediastinum. Secondary growths were also found in the liver and on the lower surface of the diaphragm. The remaining organs showed no significant abnormality. Serial sections taken from near the edge of the growth in the pancreas showed microscopically every gradation from normal tissue with varying degrees of fibrosis to well-differentiated adenocarcinoma and then to anaplastic growth. The lung tumours were found to consist of solid masses of spheroidal cells separated into groups by fibrous trabeculae, and also occasionally more differentiated areas of columnar-cell adenocarcinoma.

COMMENT

Although carcinoma of the pancreas is very rare under the age of 20, we have found in the literature reports of eight cases, which were confirmed at necropsy. Mielcarek (1935) reviewed five previous cases and added one of his own. Since then Smith (1935) reported a case of a boy aged 14½, and Corner (1943) described a case of a baby girl aged 7 months. A possible ninth case (Kaletcheff, 1939) in a girl of 14 is quoted by Schnedorf and Orr (1941).

Only three of these cases were found at necropsy to have pulmonary metastases. In Kühn's patient (1887), a girl aged 2, the primary growth was in the head of the pancreas; there was a single secondary nodule in the lungs, and the only respiratory symptoms were due to a terminal pneumonia in the left lower lobe around this nodule. Kaufmann (1927) described the post-mortem findings in a girl aged 19: the primary growth was situated in the tail of the pancreas, and there were secondary growths in the liver and lungs; unfortunately no clinical details are given. In Smith's case the whole pancreas was involved; multiple metastases were found in the lungs as well as in the liver, lymph nodes, stomach, and adrenals; and respiratory symptoms were recorded throughout the illness accompanied by weakness and signs of an abdominal tumour.

The formation of extensive secondary tumours, which can cause presenting clinical features, probably depends largely on the exact site of the primary growth in the pancreas. If in the tail, the tumour is more likely to remain clinically latent, until metastases develop elsewhere. Of the reported cases all arose from the head of the pancreas, with the exception of Kaufmann's and Smith's cases. In our case the primary growth was in the tail, and the symptoms and signs during life were exclusively respiratory in origin. The organs invaded by secondary growth—liver, lymph nodes and lungs—are those most commonly involved in all age groups (Arkin and Weisberg, 1949), but the extent of lung involvement was here so great as to dominate the clinical picture.

We should like to thank Dr. W. D. Wallace for his help and interest in this case.

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The International Conference of Social Work, of which Dr. René Sand was the founder, for many years president, and since 1948 honorary president, has initiated a memorial in his name, and for this purpose has opened a memorial fund inviting all those organizations and individuals who wish to pay tribute to the personality and work of René Sand to make a contribution. The fund is to be used to provide a René Sand Prize, to be awarded every two years to some individual who has rendered outstanding service in social welfare or social medicine, and presented at the biennial meetings of the International Conference of Social Work. The amount contributed will determine the length of time during which the prize can be awarded, but it is hoped to raise a sum of 10,000 dollars (£3,570), to be expended over the next 10 years. Contributions may be sent to Captain J. E. Stone, honorary secretary and treasurer of the International Hospital Federation, King Edward's Hospital Fund, 10, Old Jewry, London, E.C.2.

Reviews

INTERNATIONAL DERMATOLOGY

The Tenth International Congress of Dermatology: Proceedings, London, 1952. Foreword by Sir Archibald Gray, C.B.E., T.D., M.D., F.R.C.P., F.R.C.S., President of the Congress. (Pp. 556; illustrated. £3 3s.) London: British Medical Association. 1953.

Following an account of the organization of the congress and the list of patrons, officers, and members, the meeting of national delegates, the social arrangements, and the opening and closing ceremonies, come the main discussions. The first is on the pathogenesis of eczema, the second on the effects on the skin and its diseases of cortisone and corticotropin (A.C.T.H.), and the third on the treatment of tuberculosis of the skin and allied conditions. Readers of the discussions will obtain up-to-date views on these important subjects. Then come abstracts of interesting short papers (pp. 289–415) and clinical case reports (pp. 419–542). Some of the latter (clinical cases actually demonstrated at the congress) are listed below. They have been selected because the reviewer believes that, taken together, they illustrate "the fighting line of dermatological diagnostic progress."

Porphyria cutanea tarda in siblings (W. R. Goldsmith). Congenital porphyria in a man aged 37 (S. Gold). Naevus comedonicus with partial Sturge-Weber syndrome and extensive vascular naevi with haemangiectatic hypertrophy of leg (A. J. Rook). Keratoma palmo-plantaris in a man aged 38 (F. Ray Bettley and C. D. Calnan). Lichen amyloidosus in a Chinaman aged 68 of six years' duration (G. B. Dowling and D. R. Tipping). Localized amyloidosis in a man aged 59 of 26 years' duration (A. D. Porter and L. A. Musso). Circumscribed myxoedema of the lower extremities in a man aged 57 with bilateral exophthalmos and right-sided ophthalmoplegia (E. Prosser Thomas and E. Waddington). Sarcoidosis in a man aged 35 in whom neurosyphilis had at first been suspected (R. M. B. MacKenna and I. S. Hodgson-Jones). Epidermolysis bullosa dystrophica in a boy aged 17 (I. B. Sneddon).

Rosacea acuminata in a man aged 39 in whom a diagnosis of rosaceus tuberculides, rosacea acuminata, or sarcoidosis was suggested in 1948 (the reviewer would suggest what he calls the rosaceous type of sarcoidosis) (W. J. O'Donovan and S. P. Hall-Smith). "Benign" chronic polyarteritis nodosa in a man aged 30 with recurrent, slightly painful subcutaneous nodules in the forearms and legs (F. Ray Bettley). Polyarteritis nodosa treated with A.C.T.H. and cortisone in a man aged 53 with apparent success (G. B. Mitchell-Heggs and J. G. Holmes). Gastric and jejunal polyposis associated with melanin spots of the oral region and digits in a girl aged 17 whose younger sister had pigment spots around the mouth (references to the literature of this rare but important syndrome) (M. Feiwel). Incontinentia pigmenti in a girl aged 4 years (a sister had the same condition) (R. T. Brain and C. D. Calnan). Epidermolysis bullosa dystrophica vegetans in a boy aged 12 years whose twin brother was similarly affected and died at the age of 6 months (R. T. Brain). Miliary lymphocytoma in a woman aged 59 (F. Ray Bettley). Acanthosis nigricans in a woman aged 63 with suggested gastric neoplasm (O. L. S. Scott).

Hyperkeratosis follicularis et parafollicularis in cutem penetrans (Kyrle) in a woman aged 62 (R. M. B. MacKenna and R. H. Seville). Atrophie blanche in a woman aged 36 (A. Monroe and R. H. Meara), and another case in a girl aged 18 (F. Ray Bettley and C. D. Calnan). Local panatrophy in a boy aged 15 apparently beginning eight years ago, also in a girl aged 16 apparently beginning 12 years ago (F. Ray Bettley). Erosive gingivitis—lichen planus of mouth mucosa and vulval skin—in a woman aged 50 (L. Forman). Acanthosis nigricans with Cushing's syndrome in a man aged 28; parents were first cousins, and a paternal cousin was grossly obese (F. Ray Bettley).

Poikiloderma vasculare atrophicans of Jacobi in a man aged 30: Gougerot and Eliascheff papules seen in some of the more marked erythematous areas (J. L. Franklin and J. B. Lyon). Poikiloderma atrophicans vasculare (Lane type) with mycosis fungoides in a man aged 43 (G. B. Dowling and E. Waddington). Poikiloderma: a benign variant confined to the extremities in a man aged 63; the condition has also been described as "lichen planus erythematosus" (R. M. B. MacKenna and P. D. Samman). Calcinosis universalis beginning at 7 years in a man aged 23 whose paternal grandmother suffered from "chalk gout": no evidence of scleroderma, dermatomyositis or other "collagen disease" (Stephen Gold).

Hand-Schüller-Christian disease (with eosinophilic granuloma of right femur, "honeycomb" lungs, diabetes insipidus, and Simmonds's disease) in a man aged 61 (Brian Russell). Congenital telangiectasia of face and legs in a girl aged 6 years with dysostosis of clavicles and minor abnormalities of bony development and coloboma of right eye (H. T. H. Wilson). "Disseminated nodules of skin and bone": this title is suggested for two cases described by C. D. Evans and R. P. Warin respectively, who refer to a remarkable case discussed by F. Parkes Weber and Freudenthal (for a summary of that case see Parkes Weber's article in *Modern Trends in Dermatology*, 1948, p. 309). Dermatomyositis in a woman aged 69 with neoplasm of the cervix uteri (L. Forman). Pemphigus erythematosus in a woman aged 46 (F. Ray Bettley). Lichen sclerosus et atrophicus with alopecia in a woman aged 40: early lesions resembled morphoeaic scleroderma (J. Morgan). Lichen sclerosus et atrophicus in a woman aged 64 who had been formerly under treatment for colitis, pelvic abscess, and diverticulitis (H. T. Calvert). Bullous eruption (? acquired epidermolysis bullosa) in a woman aged 52 (Brian Russell). Bullous eruption, starting as lichen sclerosus et atrophicus, later resembling pemphigus vulgaris, in a woman aged 52 (Brian Russell). Chronic familial benign pemphigus (Hailey-Hailey) in a woman aged 45 (L. Forman and C. D. Calnan), and her brother aged 42 (L. Forman and J. Pettit): the father who died at the age of 75 had the same condition all his life. Ocular pemphigus in a woman aged 70 (L. Forman).

Poikiloderma congenitale (Thomson) in a girl aged 4 years (R. T. Brain). Another case in a woman aged 38 (G. B. Dowling and D. L. Rees). Another case in a girl aged 13 (P. D. Samman). Porokeratosis (Mibelli) in a boy aged 14 (G. Savage). Another case in a girl aged 14 whose elder sister had a similar lesion (A. D. Porter and R. H. Seville). Another case in a girl aged 14 (W. Tillman).

In the limited space at my disposal I find it impossible to give more detailed accounts. Suffice it to say that the volume, which must have taken very much time and trouble in its production, contains excellent illustrations, and constitutes a valuable memorial.

F. PARKES WEBER.

SURGERY OF AUTONOMIC NERVOUS SYSTEM

Sympathikus Chirurgie. By Professor Paul Sunder-Plassmann. (Pp. 162; 146 figures. M. 54.) Stuttgart: Georg Thieme Verlag. 1953.

The title of this volume conveys no idea of its scope and its importance. It is in fact a brilliant study based on years of research, and it deserves the most serious consideration of all who are interested in the autonomic nervous system—which is after all the background of our lives. For most of us the sympathetic nervous system is a remote and difficult field, and it is only in recent years that our attention has been drawn to its surgical importance and possibilities, largely by the work of Leriche.

The book opens with a detailed study of the anatomy of the autonomic system, both general and microscopic, superbly illustrated by drawings of special dissections and photomicrographs. This is followed by a description of the relation of the autonomic nerves to the blood vessels and lymphatics. The "neurohormonal system" is discussed in great detail, with particular reference to the thyroid and adrenal glands, and this section of the book concludes with a description of the great sympathetic ganglia. The surgical section follows, with full descriptions of sympathetic block, excision of ganglia, and other procedures. The illustrations are here again of a high order and of real practical value. To those who are working in this field we can only say that they cannot afford to dispense with the experience which is here placed at their disposal.

Both in its material content and in its production the volume is a great achievement, but the author has in his introduction expressed the spirit which has inspired his work in an allegory so perfect and so simple in its grandeur that I cannot refrain from quoting this one passage. In the little town of Mittenwald in the Bavarian Alps stands a bronze statue of Mathias Klotz, master-maker of violins in 1700. "With his knife in his hand he carves the precious violin from the wood which he himself has brought from the heights of the Karwendel. Quietly and easily he carves it from simple wood. But from

this his violin the hands of the master will draw forth immortal symphonies, which may bring even to the tired men of the twentieth century some glimpse of those things real and eternal with which their destiny still remains inseparably bound."

HENRY SOUTTAR.

TEXTBOOK OF OPHTHALMOLOGY

Ophtalmologie. By Louis Guillaumat, assisted by Suzanne Schiff-Wertheimer, Guy Offret, and André Dubois-Poulsen. (Pp. 1,263; 265 figures. 10,500 fr. or £11 11s. approx.) Paris: Éditions Médicales Flammarion. London: H. K. Lewis. 1953.

This is a large and important book, part of a larger and more important project, for it forms one of thirty-four projected volumes designed for the general practitioner as well as the specialist, dealing with the whole gamut of the medical specialties, therapeutics, and allied sciences such as bacteriology. If the remainder of the volumes are on the scale of that devoted to ophthalmology, the project is indeed formidable, and if they are of the same degree of excellence it will be greatly to the credit of French medicine.

The ophthalmological volume is written by the staff of the Clinique Nationale des Quinze-Vingts, Paris, and bears the authority one would expect from that school. It is divided into seven parts. The first is on methods of examination, but is so short and inadequate that it is difficult to see what is its value: ordinary techniques such as the exploration of the visual fields and more recent methods such as gonioscopy and slit-lamp ophthalmoscopy are equally dismissed in a few lines. The second part deals adequately with refraction and its correction, and the third, which forms the main mass of the book, discusses fully and informatively the diseases of the eye and its adnexa on a regional basis, after preliminary paragraphs on the embryology, anatomy, physiology, and clinical investigation of the part concerned. Operative techniques are less fully described than are most other matters, and the accounts are inadequate to form a sole guide to the surgeon. The fourth part, on neuro-ophthalmology (which includes ocular motility), is full and excellent, while the remaining three sections—on injuries, therapeutics, and medico-legal matters—are short.

The book itself is based on a scheme rarely seen in Britain. It is in loose-leaf form—but very substantially bound, so that it should resist much rough use—and the intention of the publishers is that additional pages will be supplied annually supplementing the original text and adding new knowledge as it appears. If this can be adequately carried out, it is an excellent and economic suggestion.

STEWART DUKE-ELDER.

VECTOR CARDIOGRAPHY

Spatial Vectorcardiography. By George E. Burch, M.D., F.A.C.P., J. A. Abildskov, M.D., and James A. Cronvich, M.S. (Pp. 173; 121 illustrations. 37s. 6d.) London: Henry Kimpton. 1953.

This is a book we can certainly recommend to anyone who wishes to learn something of the subject. The reader must not be dismayed by the formidable definition on p. 10: "The vectorcardiogram may be defined as a record of the time course of the mean instantaneous electric spatial vector forces from the heart." Most of the book is much simpler than this. The expression throughout is clear and free from jargon. The information is neatly summed up. The fairly varied type gives clarity and emphasis. The advantages and disadvantages are set out in a judicial way, so that the reader gets a fair discussion of the various topics without bias of view.

As the heart is a three-dimensional structure enclosed in a volume conductor, the electrical events occur in space. In order to obtain a spatial vectorcardiogram a three-dimensional reference frame is needed. The authors favour the equilateral tetrahedron, the triangle of Einthoven forming the base, or frontal plane, and the apex being a point on the back, just to the left of the seventh dorsal vertebra. In order to get a stereoscopic effect two projections are used, frontal and sagittal; the true stereoscopic record is obtained by specially selected resistances. This part is difficult to follow. The authors claim that stereovector cardiography simplifies the subject, avoids the making of wire models, and may eliminate some of the electrocardiography. They think that vector cardiography may perhaps be helpful in detecting the presence of infarction in the left ventricle when the activation of that chamber is delayed, but admit that much more study, with post-mortem confirmation, is needed. They find that hypertrophy of the left ventricle, which may produce electrocardiographic patterns resembling those of bundle branch block, can perhaps be distinguished by vectorcardiograms, which appear to be different when bundle branch block is present without hypertrophy. The presence of right ventricular hypertrophy could also be detected when bundle branch block on that side was present.

The authors point out that this subject is still in its early stages and that standardization of methods and nomenclature is most important. They would not claim that it replaced the electrocardiogram: it is obvious that the important early alterations in the T-waves are difficult to pick up in the vectorcardiogram. Altogether, this is an interesting and stimulating little book, clearly written, with a balanced and judicial view of the subject so far as it has developed at the present day.

TERENCE EAST.

SLIPPED EPIPHYSIS

Slipped Capital Femoral Epiphysis. By Armin Klein, M.D., Robert J. Joplin, M.D., John A. Reidy, M.D., and Joseph Havelin, M.D. American Lecture Series. (Pp. 130; 77 figures. 49s.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1953.

This monograph composed by four surgeons from the Massachusetts General Hospital incorporates the knowledge gained from the study in diagnosis and treatment of 81 cases of slipped capital femoral epiphysis. Early radiological diagnosis is described in detail and thrown into relief by an excellent survey of the appearances of hips in both sexes from infancy until the closure of the upper femoral epiphysial line. The authors have divided their cases into three clinically distinct groups: (1) sudden traumatic displacement of the epiphysis, (2) a gradual and minor degree of displacement, and (3) a gradual and major degree of displacement. In each group surgical treatment is recommended, though differing from one to the other.

It is perhaps regrettable that the authors have not given a more detailed description of the operation for subcapital osteotomy, a procedure that others have not so often found to give good results as these leaders in this particular field. It was disappointing that a survey of results of previous conservative treatment was not included to serve as a comparison to the excellent follow-up results of this review.

This work is a valuable guide in the modern management of adolescent coxa vara, and the reader can be left with little doubt that the results of surgical treatment are superior to the older method of traction and immobilization.

PHILIP NEWMAN.

The Medical Directory for 1954 (J. and A. Churchill Ltd., London, 72s.) is the 110th annual issue of a work which is indispensable in an editorial office, in libraries, and in clubs which maintain reference books for their members. Medical men who replace their old copies from time to time would be advised to make the change now, for the present two volumes are an improvement over the former in that there is no longer that invidious distinction between London, the provinces, and other parts of the British Isles. The 80,983 names in the 1954 edition are listed alphabetically without any topographical distinction. This makes for much easier reference. The "local lists" are grouped together in the second volume, which also includes the usual information about health departments, learned bodies, postgraduate institutions, and the hospitals of the various regions. The first volume gives helpful details about medical periodicals, medical trades, the General Medical Council, and so forth. Messrs. J. and A. Churchill are to be congratulated on maintaining a remarkably high standard of accuracy and on improving the usefulness of this work.

BRITISH MEDICAL JOURNAL
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REMUNERATION OF CONSULTANTS AND HOSPITAL MEDICAL STAFF

The report of the Spens Committee on the Remuneration of Consultants and Specialists was published in May, 1948, and in the House of Commons on June 3 of that year Mr. Aneurin Bevan, then Minister of Health, said, "I should like to add that the Government accept the recommendations in principle. The task of evolving from it the best scheme of remuneration, to suit all cases—and especially the bearing of the recommendations on remuneration for teaching duties—will be difficult and will require the help of the profession in discussion. I propose to begin this quickly. . . ." In this week's *Supplement* we publish details of the agreement between the Staff and Management Sides of Whitley Committee "B" on the increases in the rates of pay of consultants and hospital medical staff along with a statement on the situation by Sir Russell Brain, P.R.C.P., chairman of the Staff Side. The increases can be briefly summarized. House officers are to receive an annual increase of £50 (£75 minus £25 for residence); senior house officers, junior hospital medical officers, and registrars of £75; senior registrars of £100; senior hospital medical officers of £200. The basic scale for consultants is to be increased by £400 at the minimum, tapering to £350 at the maximum, giving a scale of £2,100 to £3,100; consultants with "C" awards will have the same increase, with resultant scale of £2,600 to £3,600; those with "B" awards will receive an increase of £150, with a resultant scale of £3,400 to £4,400; the consultants with "A" awards will receive an increase of £50, the scale becoming £4,300 to £5,300. All these represent the increases over the rates of pay of 1948, and will not be retrospective. There is protection against anyone's present remuneration being diminished (no-detriment protection), and the maximum weighting allowed to part-time consultants and S.H.M.O.s is to be reduced from one and three-quarter sessions to three-quarter sessions; otherwise weighting will be the same.

It is difficult to see on what basis these increases have been determined; and it appears that the negotiators were not armed with the facts and advice that an expert economist and statistician might have given them. Sir Russell Brain points out that in the draft terms accepted in 1948 by the hospital staffs the betterment factor was then the same as that given to general practitioners—namely, 20%—but that this betterment factor was not accepted by the profession as being a realistic adjustment of the 1939 figures to post-war conditions. In January, 1949, a deputation from the Joint Consultants Committee and the General Medical Services Committee made representations to the Ministry on this, the Ministry then declining to make any upward adjustment. In July of that year the Ministry of Health assured the Joint Committee that changes would not be made in the terms and conditions of service without discussions through the Whitley machinery, that remuneration was looked upon as a subject suitable for arbitration, and that save in exceptional circumstances remuneration would become the subject for arbitration or inquiry. Accordingly the Joint Committee advised hospital staffs to accept permanent contracts on the basis of the terms and conditions of service then offered. Sir Russell then briefly reviews the general practitioners' negotiations, culminating in the Danckwerts award, and quotes the statement made by the Chancellor of the Exchequer in the House of Commons in July, 1952, to the effect that the Government did not adopt the view that similar adjustments in other fields would follow. Legal advice since then is to the effect that the Staff Side had no claim which was enforceable at law, and Mr. F. Grant, Q.C., "did not think that it could be argued that an undertaking by the Ministry to implement the terms of the Consultant Spens Report was a part of the contract on which consultants entered the Service." Sir Russell goes on to argue that there was little likelihood of the Government's applying the Danckwerts decision to the remuneration of consultants and hospital medical staffs. He concludes that "the Staff Side is satisfied that the settlement it has achieved does in fact restore the balance between consultant and general-practitioner remuneration which was upset by the Danckwerts award"; and that "the Staff Side is . . . satisfied that the agreement it has made with the Management Side in no way weakens the Spens Report as a basis of consultant remuneration."

As was pointed out in a recent leading article,[1] the Staff Side negotiators on behalf of consultants and hospital medical staff are chosen by the Joint Consultants Committee, which has on it representatives from the Royal Colleges and Corporations of England and Scotland, and from the Central Consultants and Specialists Committee of the B.M.A., the distinguished President of the Royal College of Physicians acting as chairman. The British Medical Association has not in fact conducted the negotiations (as it did for the general practitioners). The B.M.A. has a clear-cut policy on the remuneration of consultants and that is that they should be based upon the Spens recommendations, a policy, after all, which was the policy of the Government six years ago as stated by Mr. Bevan and which has not yet

[1] *British Medical Journal*, March 13, 1954, p. 634.

been repudiated. It is therefore necessary to look at the present proposals in the terms of the Spens Report and to see how far they may or may not fall short of them. The actual sum of new money —some three million pounds—is perhaps less important than any departure from the principles of the Spens Committee. The levels of remuneration in the Report were in the 1939 terms of money, and the Committee made it clear that these should be adjusted in relation both to the present value of money and to the increases "which have in fact taken place since 1939 in incomes both in the medical and other professions." The Spens Report went on to add this: "In our judgment it is only if corresponding changes are made in the incomes of consultants and specialists that the recruitment and status of various branches of specialist practice will be maintained." Further on the following point was also made: "We would emphasize that if the best possible recruits are to be attracted to specialist practice there must remain for a significant minority the opportunity to earn incomes comparable with the highest that can be earned in other professions. . . . We concluded that specialists of the highest eminence should be able, in the public Service, to aspire to a remuneration of the order of £5,000 for clinical work." This attitude afforded the strongest argument for the merit awards, about which some doubts were expressed at the time. There could, however, be little disagreement with the view that to attract men of the highest calibre into medicine there should be for the few at the top rewards which would enable medicine to compete effectively with other professions for those who would add lustre to it. It is rather difficult to relate the Spens maximum of £5,000, *in terms of 1939 values of money*, to the present agreement that consultants with "A" awards will go up to a maximum of £5,300. This represents a betterment factor of 6% on 1939 values (excluding the Government's contribution to superannuation). This is not to ignore the position of those in the other ranks of consultants or hospital medical staff, and they will not take it amiss if it is suggested that it is the example and excellence of the eminent in a profession which set a standard for their colleagues not only in professional worth but also in prestige. A further departure from the Spens recommendations is in the alterations of weighting for part-time specialists, and whole-time consultants and specialists may doubt whether this slight relative improvement of their position is so satisfactory as would have been agreement on the allowances for their expenses which the Spens Committee recommended: the Staff Side will continue to press for these.

Consultants and hospital medical staff, either individually or through their various representative bodies, will express their own views on the present agreement, and in doing so will no doubt take into account the extremely difficult position with which their hard-working negotiators have been faced, made still more difficult by the fact that the profession still has no right to insist upon arbitration. The present is perhaps less important than the future, and consultants would want to feel assured that their representatives of three, five, or ten years hence will be able to negotiate on the basis of the Spens recommendations, for it was these more than anything else which persuaded consultants to go into the N.H.S. in 1948. Sir Russell Brain says that in the view of the Staff Side "Spens remains the yardstick of consultant remuneration, and either side of Committee 'B' is free to seek future adjustments in any grade if experience shows that the present settlement is working unfairly." But it is not easy to escape the conclusion that the Spens recommendations have been so far departed from as to weaken still more their influence on subsequent Ministers and Ministries. Unless the present Minister of Health makes in the House of Commons a similar statement to Sir Russell's and to that of Mr. Bevan in 1948, consultants and hospital medical staff and the profession as a whole will remain uneasy about the future.

DOMICILIARY OBSTETRICS

The designation of general-practitioner obstetricians under the National Health Service Acts aimed at encouraging interested practitioners to acquire post-graduate experience in obstetrics, but only an extremely low standard of supervision before, during, and after labour is required to qualify for payment. In a review of domiciliary midwifery on page 841 of the *Journal* this week Dr. Ivor Cookson, as others have done previously, points out that if the doctor does no more than fulfil these minimum requirements he cannot practise good obstetrics, for he will not recognize anaemia or toxaemia nor diagnose twins or breech presentation at a desirably early time in pregnancy, nor will he prevent unnecessary delay in the second stage of labour, nor bleeding in the third stage. But, if matters are to be remedied, the general practitioner needs something more than a good training and a conscientious attitude; he needs, as Claye has pointed out in a challenging paper,[1] a large enough practice in midwifery to enable him to maintain his skill and knowledge. The increasing popularity of hospital confinement therefore presents a serious problem. For, despite ministerial fiats and financial inducements, the extent of domiciliary obstetrics is gradually diminishing, chiefly because more and more women are preferring to be confined

[1] Claye, A. M., *Midwives Chronicle*, 1954, **67**, 40.
[2] Sheehan, H. L., *British Medical Journal*, 1949, **1**, 849.
[3] Jameson, J. E., and Handfield-Jones, R. P. C., *Lancet*, 1954, **1**, 665.
[4] Jeffcoate, T. N. A., *British Medical Journal*, 1953, **2**, 951.

in hospital. Nevertheless a sufficiency still remains to make it desirable for the scope of domiciliary midwifery in terms of pure obstetrics to be delineated. It is in this regard that Dr. Cookson's paper, which gained for him the Sir Charles Hastings Clinical Prize for 1953, is particularly pertinent.

One of the objects of his survey was to find out how to select cases for hospital delivery so that the remainder could be delivered at home in reasonable, if not absolute, safety. It is noteworthy that in addition to the well-recognized indications for hospital confinement such as high parity, bad obstetric history, antepartum haemorrhage, toxaemia other than of mild degree, and concomitant general disease, Dr. Cookson has found from experience that premature delivery, breech delivery, and multiple births involve too high a rate of foetal loss to be acceptable for delivery at home. On the other hand, he believes that normal primigravidae need not be booked for hospital confinement unless over 30 years of age, nor transferred there unless labour is prolonged beyond 24 hours. With such a careful selection of cases, abnormalities will be rarely encountered in women labouring at home; nevertheless they must then be recognized early and treated adequately, if only pending the arrival of an obstetric flying squad. In particular, complications of the third stage and postpartum haemorrhage require skilled handling. Dr. Cookson believes that the prophylactic intravenous injection of ergometrine towards the close of the second stage should be more widely administered in domiciliary practice, especially after forceps delivery and in women of high parity. This procedure is generally regarded as best reserved for hospital practice, but there is much to commend its use to prevent postpartum haemorrhage in the home where blood transfusion is not readily available. The objection, not universally admitted, that manual removal of the placenta is then more often required is not valid, for in any environment postpartum haemorrhage is more dangerous to the patient than the operation of manual removal. Even in the absence of bleeding it is wiser not to leave the placenta in the genital tract for more than one hour.[2] If it has separated it is easily expressed; otherwise 0.5 mg. of ergometrine may be given intravenously or intramuscularly, and if the placenta is not then delivered it should be removed manually. The modern view is to recommend that this operation should be carried out either by the general practitioner or by the flying squad in the home rather than transfer the woman to hospital with the placenta still retained, for severe shock or haemorrhage or both may occur on the journey.

Dr. Cookson is rightly concerned at the high proportion of women delivered at home in whom the second stage was prolonged beyond two hours, notably one in every four primigravidae. He argues with conviction that many of these long second stages can be eliminated by the midwife calling the doctor earlier and more often and by the doctor having more frequent recourse to episiotomy, a procedure which will also reduce the forceps rate. He found that episiotomy was performed in only 17 of 74 domiciliary forceps deliveries in his area. Yet in 32 of the remaining 57 women the perineum was torn, in 4 of them through to the rectum. This, he remarks, is too high a price to pay for trying to avoid suturing. Perhaps undergraduate teaching on the indications for episiotomy, and practical instruction in the ease with which these and lacerations can be repaired under adequate local analgesia, are not emphatic enough.

Dr. Cookson concludes from his survey that any family doctor who is interested in domiciliary obstetrics and has had adequate and pertinent instruction can, in any area in which consultant support is available, supervise maternity cases with reasonable freedom from risk to mother and baby. There is no doubt that this conclusion is valid in regard to antenatal supervision. But it is doubtful whether it holds good equally for intranatal care, especially at a time when less than one woman in four of those delivered at home sees a doctor during labour and then often only when he is summoned by the midwife. However carefully the potentially abnormal cases are sifted antenatally, unforeseen complications may arise suddenly in labour to prejudice the life of mother or baby, and all facilities are not readily available at home to deal with these. One possible solution to this problem, which might also satisfy the demand by patients to be delivered in hospital, is the provision of hospital beds for general-practitioner obstetricians on the lines reported last month by Jameson and Handfield-Jones[3] in a paper which, in terms of obstetric practice for the family doctor, is in striking accord with that of Dr. Cookson. However, while such provision reduces the risk, especially for the baby, it cannot produce the best possible results unless arrangements are made whereby the general practitioner who engages in obstetrics has a large enough midwifery practice to develop and maintain a high degree of special knowledge and technical skill. Means must also be found by some rota system whereby one doctor is always immediately available in emergency. The factor chiefly responsible for the dramatic fall in maternal and foetal mortality and

morbidity in the large maternity hospitals was the introduction of highly qualified resident, as distinct from non-resident, obstetricians,[4] for the hospital consultant, like the general practitioner, is not always immediately available for assistance or even advice. Indeed, a maternity hospital without skilled residents in obstetrics, paediatrics, and anaesthesia is not fully equipped to reduce risk to mother and baby to the minimum. But no matter how desirable this may be from the standpoint of statistics it is clearly an ideal not universally obtainable, and in any case it sometimes results in an impersonal type of efficiency. There will always be women who are happier having their babies in the familiar surroundings of their homes or in the friendly atmosphere of the small hospital staffed by attendants they know. These two reports from the same county by Dr. Cookson and by Drs. Jameson and Handfield-Jones indicate that the general-practitioner obstetrician can cater for these patients with a high degree of freedom from risk to mother and baby.

CONJOINED TWINS

In the opening pages of this issue we publish a paper by Professor Ian Aird entitled "The Conjoined Twins of Kano." These were the "Siamese" twins from Nigeria who hit the headlines with rather an alarming impact five months ago. Much of the information that appeared in the newspapers at the time was accurate, though of course incomplete, and much was wild surmise, and those whose appetite for further details was sharpened by the newspaper reports can now turn to Professor Aird's clear and dispassionate account of the investigations carried out on these twins and of the operation which separated them.

The great rarity of conjoined twins probably accounts for the fact that there is still doubt about the exact aetiology. It is thought that the origin of the malformation occurs very early in foetal development, either before the embryonic disk is differentiated, or by the initiation of two centres of axial growth instead of one in the embryonic plate. The position of the extra centre of axial development in relationship to the primitive streak may account for the type of conjoined twin produced.[1] It used to be held by some that many of the teratomatous malformations seen in the newborn were examples of twinning. This theory is not now generally accepted, and it is believed that such cases, and duplications of organs and parts of viscera, are due to other causes.

The classification of the varieties of conjoined twins is complicated. The position of the joined area is easily described in the symmetrical types—for example, xiphipagus (joined at the lower sternum), or craniopagus (joined by the heads). But the classification of the more bizarre forms becomes extremely complicated. Potter[2] has described and illustrated very well the almost surrealist range of monstrosities —mostly incompatible with life—which may occur. It has been generally accepted that conjoined twins are always uniovular in type. Professor Aird, however, casts some doubt on this theory. His reasons are that in the majority of the cases described the twins have not appeared identical, and he quotes several anatomical and pathological differences between them. While the proof that some conjoined twins are in fact polyovular is difficult, his views gain support from the fact that there is a family history of twinning in some of the cases described. Monovular twinning is unrelated to a family history of twins and occurs in the same ratio in all pregnant women. Polyovular pregnancies are more frequent when there is a history of twins in either parent.

The separation of conjoined twins ranges in difficulty from the division of a small bridge of skin joining the umbilical region to what is often an impossible surgical problem. The number of cases in which both twins have survived operation is small: Professor Aird mentions that the first recorded successful separation was carried out at the Military Families Hospital at Portsmouth in 1912. It seems probable that when there is a large interchange of blood between the circulations of conjoined twins one twin becomes dominant to some degree. Stockard's[3] notable work on this subject was carried out more than thirty years ago. Professor Aird stresses the importance of finding out how much one twin relies on the dominant partner not only for anatomical structures but for the production of hormones such as cortisone. His detailed description of the Kano twins is an important contribution to the sparse scientific literature on the subject, and the well-documented record of the complicated pre-operative tests carried out to determine the chances of a successful separation, and of the operation itself, will be of the greatest value to any surgeon faced with the same problem. Those who saw the film of the operation at the Royal Society of Medicine on Wednesday this week will, by reading Professor Aird's paper, be able to complete the picture of this brilliant example of teamwork at the Hammersmith Hospital.

[1] Keith, Arthur, *Human Embryology and Morphology*, 6th ed., 1948, London.
[2] *Pathology of the Foetus and the Newborn*. 1952. Chicago.
[3] *Amer. J. Anat.*, 1921, **28**, 115.

THE ESTIMATES

The most noteworthy feature of the Health Service estimates for the financial year that has just opened is the apparent standstill in the cost of prescriptions. Ever since a tight hold was imposed on hospitals' spending, the pharmaceutical service has been the most uncontrollable part of Health Service financing. The charges for dentures and, in particular, for dental treatment and the charge for spectacles led to a sharp fall in the amount the taxpayer had to find for these two branches of the Health Service. But the shilling charge for prescriptions appeared to be an inefficient brake. The latest figures available for the number of prescriptions dispensed—for the calendar year 1953—show a higher total than ever.

The year 1952–3, the first year in which the charge was in existence, was an abnormal year in the amount of illness that occurred in the winter months. Nearly £5m. was added to the drugs bill for this reason alone. The year just ended has been more fortunate in this respect, and there may well have been some falling off in the number of prescriptions dispensed in the winter months of 1953–4 compared with the previous winter. But the Ministry of Health is perhaps counting on a greater saving in the cost of each prescription than in a fall in the total number. The detailed estimates show that payment to chemists in respect of dispensing fees are expected to be slightly higher in 1954–5 than in 1953–4. A small fall, on the other hand, is shown in the cost of ingredients. Perhaps Mr. Macleod is relying on achieving some savings by his appeal to doctors to prescribe from the *National Formulary* wherever possible. Figures given in Parliament a few weeks ago show that in the first half of last year the average cost of each prescription was 49.15d. This is over a shilling more than in 1949. Even when allowance has been made for the development of expensive antibiotics since then, there would appear to be room for economies without interfering with the doctor's freedom to prescribe what he thinks best for his patient.

The total net cost of the Health Service to the taxpayer is expected to rise by some £16m. in the new financial year. Most of this rise can be attributed to higher advances to hospital boards; the estimate for these advances allows for increases in wages and salaries. An extra £4m. is also to be allowed to these boards for capital expenditure. This increase is welcome in itself. Even so, much larger sums will have to be spent on improving the hospitals' accommodation—particularly that of the mental hospitals—before anyone can accuse them of extravagance in this respect.

In the other branches of the Health Service, it is worth noting that the initial check to dental treatment caused by the charges is evidently wearing away to some extent, and there is a rise of nearly £2m. in the estimate. A somewhat similar trend can be observed in the supplementary ophthalmic service. But the whole cost of the Health Service is so dominated by the hospitals, whose advances on capital and revenue account combined now exceed £300m. a year for the first time, that increases elsewhere seem small beer indeed.

To sum up, and apart from long-term factors such as the ageing of the population, the Health Service's finances appear to have achieved some sort of stability. But this has been secured only at the cost of deferring many worth-while schemes and in particular of postponing much hospital building which will have to be undertaken some time. The fixed limit of £400m. a year as the amount the taxpayer would have to find for the Health Service has been abandoned. Instead a sharp brake has been imposed, which is released only when the pressure on it is too heavy to be withstood. Unfortunately, the result precludes any form of planning —of expanding here and contracting there—which is essential for a wise administration of the hospitals. It is probable that, without any increase in the amount voted, the money could be spent to better advantage if there were less control at the centre and more independence elsewhere.

LOCAL HYDROCORTISONE

The recognition that cortisone, or hydrocortisone, which is the adrenal steroid occurring in the body, produces many of its effects through an anti-inflammatory mechanism[1 2] rather than by any fundamental influence on underlying disease processes has led to some change of approach to the use of these drugs. Much attention has been directed to their value in chronic inflammatory joint disorders of the rheumatic type, partly no doubt as a result of the original discovery of their effects in rheumatoid arthritis. Further experience of their use in the management of this disease has shown that the prolonged systemic administration of cortisone is not always entirely satisfactory in controlling symptoms,[3 4] and, although hydrocortisone may be more active[5 6] when given systemically, there is little doubt that it is apt to be similarly unsatisfactory. There is evidence that the source of the pain of arthritis is in the joint capsule, and perhaps to a lesser extent in the synovium,[7] and, since systemic administration of these hormones diminishes joint temperature and blood flow,[8 9] it was logical to study the effect of local injection into the joint space. As expected, it was found that both reduced the amount of joint fluid, lowered the cell count, especially of polymorphonuclears, and increased the viscosity.[10 11] These changes are accompanied by temporary clinical improvement which cannot be attributed to any general systemic effect, even though the rate of absorption from the joint is at much the same rate as from intramuscular injection. Most

1 Lovell, R. R. H., *et al.*, *Clin. Sci.*, 1953, **12**, 41.
2 Duke-Elder, Sir S., and Ashton, N., *Brit. J. Ophthal.*, 1951, **35**, 695.
3 West, H. F., and Newns, G. R., *Lancet*, 1953, **2**, 1123.
4 Kellgren, J. H., and Hill, A. B., *Ann. rheum. Dis.*, 1953, **12**, 239.
5 Boland, E. W., *British Medical Journal*, 1952, **1**, 559.
6 —— *Ann. rheum. Dis.*, 1953, **12**, 125.
7 Kellgren, J. H., and Samuel, E. P., *J. Bone Jt Surg.*, 1950, **32-B**, 84.
8 Janus, O., *British Medical Journal*, 1950, **2**, 1244.
9 Hollander, J. L., *et al.*, *J. Amer. med. Ass.*, 1951, **147**, 1629.
10 Stevenson, C. R., *et al.*, *Ann. rheum. Dis.*, 1952, **11**, 112.
11 Dixon, A. St. J., and Bywaters, E. G. L., *Clin. Sci.*, 1953, **12**, 15
12 Kersley, G. D., and Desmarais, M. H. L., *Lancet*, 1952, **2**, 269.
13 *Annual Report* of West London Hospital Department of Rheumatic Diseases, 1953.
14 *Ann. intern. Med.*, 1953, **39**, 735.
15 Brown, E. M., *et al.*, *Amer. J. Med.*, 1953, **15**, 656.
16 Harrison, M. H. M., *et al.*, *J. Bone Jt Surg.*, 1953, **35-B**, 598.
17 Ibid., 1953, **35-B**, 627.
18 *British Medical Journal*, 1953, **2**, 966.

workers are agreed that cortisone has a less reliable and constant effect than hydrocortisone when given intra-articularly,[11 12] although Fearnley[13] believes that this is simply a reflection of different effective therapeutic doses, twice as much cortisone being required to produce a comparable effect.

Hollander and his colleagues[14] have found that intra-articular injection is a relatively simple procedure and suitable as an ordinary out-patient manœuvre; not only the knee but most other joints except those of the spine are accessible, the hip being the most difficult. They have now been able to report their clinical results after nearly 4,000 such injections in over 500 patients suffering from various types of rheumatic condition, using a dosage of 25 mg. of hydrocortisone for the larger joints (occasionally increased to 50 mg.) and of 5 mg. for the small joints.[15] In rheumatoid arthritis they found that such treatment gave continued local palliation with repeated injections as often as symptoms returned—every one to four weeks—in 90% of the cases selected. The use of hydrocortisone in this way is, as they emphasize, only an adjunct to the general management of the patient. Selection of patients was restricted to those in whom one, or very few, joints were affected, or predominantly affected and resistant to other treatment. Although the effect of systemic cortisone has been almost uniformly disappointing in osteoarthritis, local injection may be more helpful, for 20% of their cases had no return of symptoms after a series of injections, some 6% having been followed for more than one year. This response is not necessarily so inexplicable as it may seem at first, for Trueta and his colleagues[16] and Lloyd-Roberts[17] have recently thrown light on the pathology of osteoarthritis. Both have shown that hyperaemia either in the juxtachondral bone or in the synovium and capsule is an important feature of this type of arthritis, and the suggestion of Trueta that compression of cartilage by use is necessary for its healthy nutrition might give such therapy a theoretical basis and open the way to a new and more active therapeutic approach to the problem of degenerative joint disease.

As might be expected, the more transient, self-limiting articular and non-articular inflammatory conditions showed a good response. Thus acute gouty and traumatic arthritis often responded well to a single injection. The results of Hollander and his colleagues in non-articular conditions were similar to those which Cyriax reported recently in this *Journal*.[18] Acute sub-deltoid or pre-patellar bursitis responded well; the results in tennis elbow and stenosing tenosynovitis were encouraging also, but in chronic sub-deltoid bursitis they were disappointing. Untoward effects were rare and were usually mild, occurring at the rate of 2.3% of injections. Most of them were temporary local flares, but acute staphylococcal joint infection occurred in one case. They also record that one case of tuberculous arthritis was injected as a result of faulty diagnosis. It is clear that the presence of infection is an absolute contraindication to this form of therapy. In view of these very encouraging reports it is unfortunate that supplies of hydrocortisone are so scarce in Britain, but it is to be hoped that sufficient will be made available to allow for controlled therapeutic trials to investigate further its place in the local therapy of these various rheumatic conditions.

SYNTHETIC ATROPINE

In spite of the enormous output of synthetic drugs in recent years there are still many indispensable drugs of plant origin which cannot be produced synthetically at an economic price and for which no entirely satisfactory synthetic substitute has been found. Until recently atropine belonged to this group. No doubt in Britain we could cultivate *Atropa belladonna*, or other plants containing atropine, on a sufficient scale to supply our needs, but we have normally relied upon other countries, in which atropine-containing plants grow wild, for this essential alkaloid. During the last war a serious effort was made to find a synthetic substitute for atropine, because at the time it was thought, and probably quite rightly, that the synthesis of atropine itself was not a practical proposition. Atropine was first synthesized in 1896 by Willstätter, but his synthesis involved fourteen stages and was obviously not one which could be adapted to manufacturing processes. In 1917 Sir Robert Robinson[1] devised a new synthesis which reduced the number of chemical processes to three, but one of his starting materials (namely, succindialdehyde) was at the time economically inaccessible. It is therefore of great interest that T. and H. Smith, Ltd., of Edinburgh, have taken advantage of new methods of obtaining succindialdehyde from furan and have developed a process for manufacturing atropine based on the Robinson synthesis.

Whether synthetic atropine will be able to compete economically with the natural alkaloid is not for the scientist to say. Synthetic ephedrine has not entirely replaced the natural drug, probably because the plants containing this alkaloid grow wild and in great abundance in many parts of Asia and can be collected and extracted cheaply; but this situation will not last indefinitely. The probability is that synthetic drugs will ultimately replace drugs of plant origin.

Atropine is an ester of tropic acid and a bicyclic basic alcohol, tropine. Pyman and his colleagues[2 3] investigated the mydriatic effects of numerous esters of tropine, applied locally to the eyes of cats, but no systematic pharmacological study of the esters of tropine has ever been made, probably because the only source of tropine was the expensive natural alkaloid, atropine. A commercial source of tropine will make possible a thorough reinvestigation of many new esters and other derivatives of this substance, which appears to have a peculiar affinity for many types of tissues in animals. Consequently the achievement of a manufacturing process for tropine and its derivatives is an important advance: it may make this country independent of foreign sources of an essential drug, and it may also lead to the development of new drugs of value in medicine.

[1] *J. chem. Soc.*, 1917, **111**, 762.
[2] Jowett, H. A. D., and Pyman, F. L., *7th International Congress of Applied Chemistry*, 1909, **4A**, i, 355.
[3] Pyman, F. L., *J. chem. Soc.*, 1917, **111**, 1108.

CLINICAL PATHOLOGY IN GENERAL PRACTICE

THE ASSESSMENT OF GONADAL FUNCTION

BY

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In both sexes the gonads serve two functions: the secretion of the sex hormones and the production of germ cells. These two functions are not entirely independent. Assessment of endocrine function can be made by purely clinical means and by special investigation. The gametogenic function can be studied by special tests alone.

Normal Development

The endocrine activities of the gonads can be considered in four phases: pre-pubertal, at puberty, in the adult, and after the close of the reproductive period.

Before puberty the gonads are physiologically functionless, not apparently through any intrinsic incompetence but because they receive no gonadotrophic stimulation. It is obvious, therefore, that before puberty a diagnosis of hypogonadism is meaningless. At a variable age, usually falling within the range 10–16 years, and for reasons which are quite unknown, the anterior lobe of the pituitary gland begins to secrete effective amounts of gonadotrophic hormone, which stimulates the gonads. Under this influence they secrete their respective sex hormones, which, acting upon their various target organs, bring about the changes of puberty. In the male the interstitial cells of Leydig secrete testosterone; and at the same time the hitherto inert germinal epithelium of the seminiferous tubules begins to proliferate and to differentiate into spermatozoa. Thus, in the male, endocrine and gametogenic functions begin at the same time.

In the female events are rather different. It appears that oogenesis—the production of potential ova—is a wholly foetal phenomenon, so that the newborn female infant possesses preformed all her potential germ cells—perhaps some 400,000. A large proportion of these disappear through atresia before puberty is reached. Thereafter, again the majority are destined to undergo atresia and no more than some 400 are ever likely to become mature ova. At puberty in the female gonadotrophic stimulation leads to the development of Graafian follicles which secrete oestrogen. It is probable that during the first year or two of postmenarchal life no ovulation usually occurs. During this phase menstrual periods are the result simply of cyclically waning oestrogen levels. Eventually, however, one of the maturing follicles becomes predominant, outstrips the rest, and from it the ovum is extruded. Immediately following this event the corpus luteum is formed and secretes progesterone as well as oestrogen. If the ovum is not fertilized and does not become embedded within the endometrium, the corpus luteum begins to degenerate and the levels of ovarian hormones fall. Following this, menstruation takes place and the cyclic changes recommence.

In the male the reproductive phase usually has no clear ending. The testis may continue to produce its hormones and spermatozoa, though on a gradually waning scale, right into old age. For this reason the "male climacteric" does not usually exist or have any outward manifestation. Occasionally, however, testicular function may decrease more abruptly, with the production of climacteric symptoms—such as loss of energy, fatiguability, impaired memory and powers of concentration, reduced libido and potency, hot flushes, and so on. These symptoms can be relieved by the administration of testosterone.

In the female the Graafian follicles are used up as described above. When no more remain the ovary ceases to produce effective amounts of oestrogen. For some time before this final stage is reached the endocrine function of the ovary becomes inadequate to maintain regular menstruation. At the menopause all menstruation ceases. Because the pituitary is no longer subjected to the inhibiting influence of oestrogen, it produces excessive amounts of gonadotrophin, which may be detected in the urine. Other endocrine glands—thyroid and adrenal cortex—tend to become hyperfunctional and so to cause the climacteric symptoms, until a new balance is eventually re-established.

Hypogonadism

Hypogonadism in both sexes may be either *primary* or *secondary*. In the former the gonad itself is the defective organ, failing to respond to gonadotrophic stimulation. In the latter there is failure of gonadotrophin production by the pituitary. It may be possible to differentiate these two types clinically. A clear-cut syndrome—Turner's syndrome—of primary hypogonadism was first recognized in the case of the female, but male examples of the condition are now known to occur. In this there is an absence for all practical purposes of the gonad, and the individual remains stunted in growth, often with a typical squat appearance, and a number of congenital anomalies usually coexist. Outstanding among these are webbing of the neck and cubitus valgus; others include coarctation of the aorta of varying degrees, supernumerary digits, squints, etc. Some elevation of blood pressure is almost invariable. Complete failure of the secondary sex characters occurs.

The key laboratory finding is an increased excretion of gonadotrophic hormone in the urine. This is due to the fact that the sex hormones normally produced by the gonads exert an inhibiting action on the pituitary production of gonadotrophin so that in their absence the pituitary becomes hyperactive. In secondary hypogonadism the characteristic appearance noted above is not found. The individual remains more or less infantilistic and may be either tall or short. Examination of the urine fails to reveal the presence of pituitary gonadotrophin. In these individuals, therefore, the fault lies in the production of gonadotrophin by the pituitary, the gonads themselves being essentially normal, though remaining unstimulated.

Androgen Production

In the male the determination of androgen production by the testis would theoretically be the logical method of obtaining an objective assessment of gonadal function. Androgen assay, however, is not a practical procedure for clinical purposes. It can be done by preparing suitable urinary extracts and testing them for their ability to induce growth of the capon's comb when applied direct to it. A more practical method is to estimate the 17-ketosteroid excretion, which can be done by purely chemical means. The 17-ketosteroids—so-called because they possess a ketone group on the 17 carbon atom of the steroid nucleus—are among the metabolites of testosterone. The position is complicated, however, by the fact that the adrenal cortex also produces androgens, some of which are metabolized to form 17-ketosteroids. It is therefore clear that, even in the absence of testicular testosterone, 17-ketosteroids will be present in the urine. Indeed, they may be produced by normal women in amounts not very different from those produced by normal men.

The mean figures for children of both sexes rise from the order of 1 mg. per 24 hours to 5 mg. before puberty. From then on the mean increases more rapidly for males than for females, reaching 14 mg. for adult males and about 9.5 mg. for adult females. The ranges for adults show considerable overlap in the two sexes, being 8–32 mg. for males and 5–20 mg. for females. In old age the mean figure again falls off with increasing years. It is thus quite obvious that the interpretation of the significance of the 17-ketosteroid excretion is none too easy, and the test has only a limited value in the assessment of male gonadal function. Of distinct value in some instances is the study of testicular biopsies. These are not difficult to carry out as a purely out-patient procedure under local analgesia, cause no undue discomfort and no loss of time from work, and enable one to assess the status of the Leydig cells, which are the source of the male hormone.

Oestrogen Production

In the female the simplest and one of the most useful objective tests of gonadal endocrine function is the study of the vaginal smear. This is obtained by inserting a cotton-wool applicator into the vagina, twirling it round a few times, and then rubbing it on a clean microscope slide. To obtain the best results this should be fixed immediately by immersion in equal parts of absolute alcohol and ether, and then stained with haematoxylin and a suitable differentiating stain such as Shorr's. In the absence of oestrogenic stimulation, the vaginal smear consists almost exclusively of small rounded basal cells with relatively large vesicular nuclei, and frequently contains many leucocytes. The fully oestrogenized smear consists of large squames which may have curled-over edges and contain either small densely staining pyknotic nuclei or larger vesicular nuclei (late intermediate cells). Intermediate grades may contain varying proportions of these different types of cell (Fig. 1). One

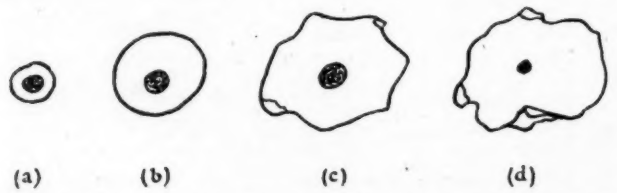

FIG. 1.—The principal types of epithelial cell found in vaginal smears: (*a*) basal; (*b*) primitive; (*c*) late intermediate; (*d*) fully cornified, with pyknotic nucleus.

drawback to this method of oestrogen assessment is that the vaginal epithelium is very sensitive to oestrogens, so that a very significantly reduced level must exist before it becomes apparent from the vaginal smear.

Another wholly practical method of oestrogen assessment is by the histological study of the endometrial biopsy specimen. This is easily obtained without an anaesthetic in the adult woman, though in girls and young unmarried women the position is, of course, less simple. An atrophic endometrium denotes either deficient oestrogen production or failure of endometrial response. Which of these alternatives is correct can be decided by studying the response to oestrogenic treatment; if, after an adequate course, the endometrium is still atrophic, a failure of target organ response may be concluded. A hyperplastic proliferative endometrium suggests a high oestrogen level but does not prove it, since the same conditions can result from prolonged though moderate oestrogenic stimulation. Under the influence of progesterone the proliferative oestrogenic endometrium becomes converted into a secretory type. Inadequacy of secretory development in the endometrium obtained during the latter part of the menstrual cycle suggests deficient production of progesterone. Once again, however, this result can arise through failure of endometrial response and can be tested for in the same manner as described above.

The assessment of oestrogen production by the determination of oestrogen excretion or levels in the blood is not yet a procedure of clinical value. In the case of progesterone, however, the estimation of urinary pregnanediol excretion is a not too difficult laboratory procedure and sometimes has practical value. Nevertheless, in normal menstrual cycles the variability of pregnanediol excretion is considerable, so that it is necessary to make several determinations on 24-hour urine collections during the supposed luteal phase in order that useful information may be obtained. It should further be pointed out that accurate methods capable of dealing with small quantities of pregnanediol must be used, since the output may be very small. Less accurate methods, which may have their value during pregnancy, are useless in the non-pregnant state. It is generally believed that the level of pregnanediol excretion reflects the level of production of progesterone by the corpus luteum, but there is no certainty that the parallelism is at all exact.

Gonadotrophin Assay

Mention has already been made of gonadotrophin estimation in both sexes and its value in differentiating primary from secondary hypogonadism. A few words about this estimation may therefore be appropriate. The test is usually referred to as the assay of folicle-stimulating hormone (F.S.H.), since F.S.H. probably is the main gonadotrophin found in non-pregnant urine. There is no doubt, however, that in some circumstances the urinary gonadotrophins include luteinizing hormone (L.H.), so that the test is perhaps better referred to simply as "gonadotrophin assay." The test requires a 24-hour specimen of urine, which should be kept chilled (preferably on ice) during the collection and should be delivered to the laboratory as soon as collection is complete. The urine is subjected to one of a variety of extraction procedures which aims at recovering the total protein content.

The methods which are in use include alcohol precipitation, ultrafiltration, and kaolin adsorption; of these the last is perhaps the most satisfactory technique. The extract is made up into a small volume with saline or distilled water, and groups of immature female mice are injected with fractions at various dilutions. At the end of the injection period (usually four days) the mice are killed, the uteri are removed, dissected free from other tissues, blotted dry, and weighed. Different laboratories have their different "mouse units"; the most commonly used definition is that quantity of gonadotrophin which will cause an increase of 100% in the mean weight of the uterus as compared with that of the controls. It must be emphasized that this assay is a relatively crude affair and that only large differences in gonadotrophin content can be detected. Generally speaking, it is impossible to say that the gonadotrophin excretion is definitely *less* than normal; at most one can say that the excretion is within the normal range or definitely increased, but this information is usually all that is required.

Semen Analysis and Testicular Biopsy

In the assessment of gametogenic function in the male the key test is the seminal analysis. To be of value the seminal specimen for this purpose should be collected by masturbation after a period of abstinence of three to five days (which should be stated). The specimen jar should be clean, dry, and warmed to something approaching body temperature. The time of production of the seminal specimen should be known. For religious or moral reasons, some men may find themselves unable to comply with these instructions; for them there is no really satisfactory alternative. It cannot be too strongly emphasized that condom specimens are utterly valueless; the presence of various chemicals in the sheath leads to the rapid immobilization of spermatozoa and often to their clumping, so that when examined the spermatozoa are invariably all dead and sperm counts are usually grossly misleading. The production of

seminal fluid by coitus interruptus again usually leads to gross errors, since the ejaculate as produced is not homogeneous and variable losses always occur when this method is attempted. If masturbation cannot be found acceptable, the only reasonable alternative is examination of the wife's cervical mucus some time after intercourse—the test being arranged during the ovular phase of the cycle. Such a test will at least determine whether active spermatozoa are being produced in reasonable numbers or not, though more precise information cannot of course be obtained.

The report on the seminal fluid should note its volume and appearance, the sperm density in millions per millilitre, the proportion of morphologically abnormal spermatozoa, and should give an estimate of the activity and viability of the spermatozoa.

The mean volume of semen is about 3.5 ml.; a volume of less than 1.5 ml. may be of serious consequence, since the interface between semen and cervical mucus after ejaculation within the vagina may be so small as to permit few spermatozoa to penetrate the mucus. On the other hand, if the volume is very large, a normal total number of spermatozoa may be so diluted that again relatively few are able to reach the cervical mucus.

Opinions vary on the lower level of sperm density compatible with normal fertility. Recent accurate studies have tended to lower this figure as compared with former views. It is probable that, provided other features of the seminal fluid are adequate, a density of more than 20,000,000 per ml. is quite satisfactory.

Density aside, it seems that the activity and viability of the spermatozoa are the most important criteria for evaluating fertility. Unfortunately, methods for the accurate determination of these criteria still leave a good deal to be desired. They also vary in different laboratories, so that it is difficult to compare the reports from the various centres. It is fair to conclude that highly fertile seminal fluid contains more than 40% of actively motile spermatozoa which retain their motility for periods in excess of 12 hours *in vitro*.

Although a great deal of attention has been paid to morphological abnormalities, it is doubtful whether most of these studies are really justified. In general, provided the proportion of total abnormal forms does not exceed 40%, the morphology of the spermatozoa is of much less importance than their activity.

Testicular biopsy has already been mentioned. Its value in the assessment of gametogenic function is twofold. In the first place, in cases of azoospermia testicular biopsy enables one to decide whether this is the result of failure of sperm production or failure of sperm delivery through obstruction of the efferent ducts. In the former circumstance the biopsy would reveal absence of spermatogenesis and in the latter a normal testicular structure. In the second place, the biopsy is of prognostic value where the seminal fluid is grossly inadequate, since a study of the histology of the testis may enable one to decide whether treatment has a chance of effecting improvement or could not possibly be of value. It is a fact that in most cases of oligospermia the biopsy reveals severe disorganization of the germinal epithelium in most tubules, while the other tubules are unaffected; clearly in these cases the stimulus to the testis must be normal and its modification by treatment cannot hope to produce any tangible results.

Tests for Ovulation

The direct study of ova is unfortunately not a practical procedure; we are, for example, quite unable to say whether the ova are morphologically normal or not, even though ovulation appears to be taking place. Our assessment of the occurrence of ovulation or its failure has to be made on deductive grounds. The principal methods in use for the determination of the occurrence of ovulation are: basal body temperature records, endometrial biopsy studies, and vaginal smear examinations.

Basal Body Temperatures.—If the temperature is carefully taken every morning as soon as the patient wakes up, and before any activities are undertaken, characteristic changes are found in ovular cycles. It is of little consequence whether the temperature is taken orally or rectally; provided the thermometer is left in place for three to five minutes and the mouth is kept closed, oral temperatures are normally quite satisfactory. Generally speaking, the temperature runs at a mean value of about 97.4° F. (36.3° C.) during the first half of the cycle, then it rises and thereafter runs at a level of approximately 98.2° F. (36.8° C.) until shortly before the period begins. It then falls to its previous level and the changes are repeated in the following cycle. In this way a biphasic pattern is produced, and this pattern is characteristic of ovulation (Fig. 2). The temperature rise during the latter half of the cycle has been shown to be due to the action of progesterone. It follows therefore that such a pattern could occur even in the absence of ovulation, provided a corpus luteum were formed. Indeed, this happens occasionally,

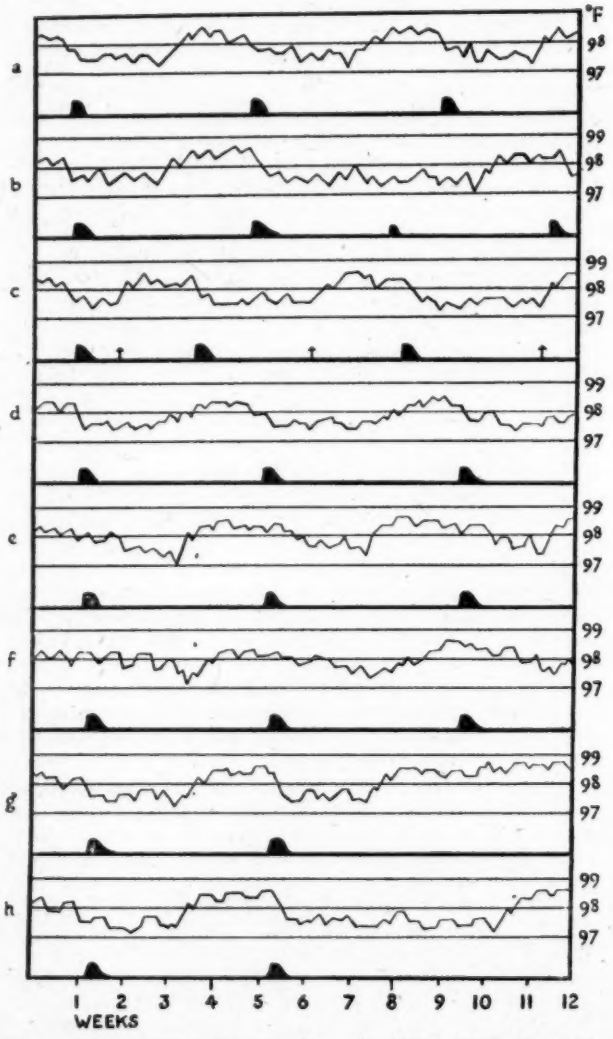

FIG. 2.—Basal temperature records. The black shapes represent menstrual bleeding. (*a*) The biphasic record of regular ovular cycles. (*b*) An anovular cycle, with no rise of temperature (monophasic) and relatively scanty period, between two ovular cycles. (*c*) Irregular ovular cycles; the intervals from the start of the periods to the arrows marking the occurrences of ovulation are inconstant, but the post-ovular intervals are of more uniform duration. (*d*) The temperature rises slowly in the post-ovular phase in this record. (*e*) The temperature falls slowly from the post-ovular plateau. (*f*) A combination of (*d*) and (*e*), so that little more than a mid-cycle depression remains to represent the biphasic pattern. (*g*) Here conception has occurred and the post-ovular plateau persists. (*h*) In this case delayed ovulation, not conception, accounts for the non-appearance of the period.

the ovum being trapped within the follicle instead of being extruded. Nevertheless, trapped ovum is probably so rare a phenomenon that it is safe to say that regular biphasic basal temperatures reflect regular ovulation. It cannot be too strongly emphasized that the temperature record merely indicates that ovulation *has* occurred. It does not indicate with any certainty *when* ovulation occurs and it certainly cannot predict when ovulation is *going* to occur. Consequently, the advice sometimes given to women wishing to conceive—to time intercourse in accordance with their temperature record—is likely merely to perpetuate their infertility, since, once ovulation has occurred, intercourse can no longer lead to the fertilization of that particular ovum. If ovulation is not taking place the biphasic pattern described above does not appear, the temperature running a more or less uniform course. When the cycles are irregular but nevertheless ovular, the temperature pattern reveals that it is the pre-ovular rather than the post-ovular phase of the cycle which is variable. If the period is overdue the basal temperature record may indicate whether the delay is due to conception or to delay in ovulation. In the former circumstance a normal pre-ovular phase followed by a prolonged post-ovular plateau will be found; if the plateau exceeds three weeks the existence of pregnancy is almost certain. In the latter case either the post-ovular rise will be missing or it will have followed a prolonged pre-ovular interval.

Endometrial Biopsy.—An endometrial biopsy taken shortly before a period is expected will reveal a secretory pattern in an ovular cycle. Such a result indicates the existence of a functional corpus luteum, from which the conclusion that ovulation has occurred is usually justifiable. If the periods are irregular it is best to take the biopsy on the first day of bleeding; if the bleeding is taking place from a proliferative type of endometrium an anovular cycle may be inferred.

Vaginal Smear.—If daily vaginal smears are followed characteristic changes occur at and after the time of ovulation, from which it is possible to infer that this event has occurred. It must be emphasized, however, that *daily* smears are necessary for such a study. The method is thus of limited value and can be applied only to patients in hospital, or to those who can be instructed to take and prepare their own vaginal smears.

The detection of pregnanediol in the urine during the latter half of the cycle has sometimes been advocated as a test for the occurrence of ovulation. Clearly, it is in general of less practical value than temperature records or endometrial biopsies.

Observations on changes in the cervical mucus have also been advocated for the detection of the occurrence of ovulation. Their limited usefulness does not warrant further elaboration.

Next article on Clinical Pathology.—"Liver-function Tests," by Professor N. F. Maclagan.

The Wellcome Foundation, Limited, has increased its authorized capital from £1m. to £3m. The issued capital has been increased to the same amount. At the time of his death in 1936 Sir Henry Wellcome owned all the shares in the Wellcome Foundation, Limited. By the terms of his will he established the Wellcome Trust, a public charity administered by five trustees to whom all the shares were bequeathed. The objects of the Trust are the furtherance of research work bearing upon medicine, surgery, and allied sciences, and the entire declared dividends of the company are at the disposal of the trustees. The Wellcome Foundation, Limited, trades under the name of Burroughs Wellcome and Co., and the capital increase will bring the issued capital more into line with the capital actually employed in the business. It foreshadows a large programme of expansion starting with a new £350,000 pharmaceutical manufacturing unit at the Wellcome Chemical Works, Dartford, on which work has already started.

Reports of Societies

THE CLINICAL ASPECTS OF IMMUNITY

A symposium on the "Clinical Aspects of Immunity" was held on March 23 at the Royal Society of Medicine, under the chairmanship of the president of the Section of Medicine, Sir HENRY COHEN. The opening speaker, Professor A. A. MILES (Lister Institute), emphasized that specific immunity usually meant antibody immunity. The two factors to be considered were the capacity of the host to produce protective antibody, and the ability of the bacterial antigens to induce antibody formation. Bacteria contained many antigens, only a few of which were capable of inducing protective antibodies. The body did not discriminate, and was as likely to make an irrelevant response to the antigens of an invading organism as it was to produce a protective antibody.

It was difficult to separate relevant from irrelevant antigens for the production of vaccines, and to assess the results of immunization. The ideal test of a vaccine was a controlled clinical trial in a susceptible community, but this had rarely been made. Vaccine had therefore to be devised largely on the basis of laboratory evidence, which was valuable but required careful interpretation.

In diseases like diphtheria, immunity was very largely antitoxic, but in invasive diseases such as cholera, enteric fever, and whooping-cough the role of toxins was less certain. Resistance to endotoxins did not always confer protection against infection by the living organism. Endotoxins were often also surface antigens; in cases where anti-endotoxic antibodies had been shown to be protective the reason was probably that they were acting as opsonins, not as antitoxins.

The search for relevant immunizing antigens had been outstandingly successful in the pneumococci. When virulent pneumococci lost their capsule they lost virulence, became useless as vaccines and susceptible to phagocytosis. Anti-capsular antibody was protective against infection and was clearly an opsonin. Another example of a non-toxic surface antigen largely determining protective immunity was the M-protein of *Str. pyogenes.* Although *H. pertussis* possessed several surface antigens, none had been conclusively proved by laboratory methods to be protective. The effective antigen had not yet been demonstrated by *in vitro* reactions.

In addition to toxins and surface antigens determining resistance to the host's defences, bacteria might possess antigenic substances that appear to be auxiliary pathogenic factors. These should not be accepted as important for artificial immunization unless there was evidence, not only that they were associated with the virulent form of the organism and had an observable effect on the host in conditions resembling those of natural infection, but that they were capable of inducing protective antibodies. For example, streptococcal hyaluronidase and fibrinolysin could not be implicated, because they did not immunize against streptococcal infection.

Antibody Formation in Virus Diseases

Professor A. W. DOWNIE (Liverpool University) spoke on the relation of antibody formation to the course of virus diseases. Not all viruses were good immunizing agents. Acute generalized diseases with viraemia such as measles and smallpox often gave lifelong immunity with high titres of circulating antibody. Localized surface infections such as influenza and the common cold gave poorly maintained immunity. Lymphogranuloma and psittacosis viruses were poor immunizing agents. Relapse was common, and the complement-fixing antibodies produced had little relation to protection.

The relation of antibody formation to the course of the virus infection could best be considered in the acute

generalized diseases. In smallpox infection in the unvaccinated, neutralizing antibodies appeared after the fifth day of illness, but most deaths occurred in the second week. This apparent paradox could be resolved by considering the course of the disease. Generalized spread of the virus occurred in the first few days. The virus quickly became intracellular and was then protected from the antibody which developed subsequently. The role of the antibody could only be to limit further spread. Necrosis of cells already parasitized could still go on. The patient's chance of recovery depended very largely on the original severity of the infection, which would not be influenced by antibody, if this appeared late. The duration and degree of viraemia were less in patients who subsequently recovered than in those who died.

After vaccination, antibody might be found for many years though individual variation was great. Exposure to infection was more likely to cause clinical disease in those whose antibody titre waned soonest, but even in these cases there remained an enhanced capacity to respond to the antigenic stimulus. Antibody was produced early and to higher titres than in the unvaccinated, and generalization of the disease was more rapidly checked. To prevent smallpox, antibody should be present in adequate amounts before the incubation period was over.

In poliomyelitis the virus was found in faeces and in the throat, and, in monkeys infected by feeding, could often be isolated from the central nervous system before paralysis appeared. Antibody, however, did not begin to appear until just before the paralytic phase. As in smallpox, efficient immunity required the presence of antibody in the serum before the end of the incubation period. This could be achieved by active immunization before exposure, or on occasion by passive immunization with immune sera in the first few days of the infection—that is, early in the incubation period.

Immunity to Protozoal Diseases

Professor B. G. MAEGRAITH (Liverpool School of Tropical Medicine) discussed immunity to protozoal disease with special reference to so-called "natural" resistance to infection. Protection in the absence of previous infection was not always as "natural" as it might appear, but often depended largely on a chance relationship of host and parasite. For example, infants in the first few months of life in endemic malarial districts often showed few signs of the clinical disease. This apparent resistance to the parasite was said to be associated with transferred maternal antibodies, but it had recently been demonstrated that it might be in fact related to their breast-milk diet.

Adventitious circumstances could also affect the acceptance or otherwise of *E. histolytica* by the host. For instance, the parasite readily established itself in the large intestine of the host, where the physico-chemical environment was suitable, but invasion could easily be restricted by changing this environment by varying the diet of the host. Invasion of the intestinal wall by *E. histolytica* depended on many things besides the establishment of the parasite in the gut lumen. The chance of contact with the epithelium and the length of that contact were important, for example. The presence of an inhibitor of the proteolytic enzymes of the parasite was sometimes decisive. Moreover, the host possessed a kind of negative resistance in that the conditions in its tissues were unfavourable for the parasite's development and the latter could apparently not easily adjust conditions to suit itself. Changes in the host tissues might lead to establishment and multiplication of the parasite. Induced hypersensitivity might be important in this respect, as shown in the development of amoebic liver abscesses after intraportal injection of parasites in guinea-pigs with "chronic" gut infections or "sensitized" to amoebic antigen.

It was probable that when an animal was sensitized to amoebic products the presence of metastatic amoebae in the liver caused a reaction which led to profound local circulatory changes resulting in the creation of conditions suitable for growth and multiplication of the parasite.

Acquired resistance was demonstrable in many parasitic infections, including vivax malaria. In this infection the resistance was specific for the species, and there was little overlap, even with other strains of the same parasite. It was reasonable clinical practice to separate patients with vivax malaria into those likely to have resistance and those unlikely to have any. Patients with previous exposure to infection, especially after repeated reinfection, developed a strong resistance to the clinical manifestations of the disease. A single dose of a good schizonticidal drug would in these patients usually abort an attack. In the case of a resident in an endemic malarial area this was all that was required. Eradication of the disease in such individuals might eventually lead to loss of valuable acquired resistance. In the case of an infected person taking up permanent residence in this country, however, eradication of the disease was desirable. Treatment comprised the use of a powerful schizonticide and of an 8-amino quinoline.

Antibiotic Therapy and Resistance

The discussion was opened by Professor R. CRUICKSHANK, who stressed the effect of chemotherapy on immune responses. In scarlet fever administration of antibiotics limited the production of streptococcal antibodies, and while this increased the risk of recurrences it was also paradoxically associated with a decreased incidence of rheumatic fever following streptococcal infection. In long-continued fevers such as typhoid fever immunity developed relatively slowly. Interference with the natural course of the disease by antibiotics greatly reduced the degree of immunity attained, as was shown by the sharp rise in relapse rates in enteric fever following the introduction of antibiotic therapy. A solution to this problem might be to combine antibiotic therapy with immunization with an efficient vaccine. In enteric fever, however, vaccines gave relatively incomplete protection, and there was a need to define the antigenic fractions required for immunization.

Dr. D. MCCLEAN emphasized the importance of early passive immunization in virus diseases after exposure to infection. He advocated the collection of blood after vaccination or from convalescents in order to prepare the appropriate immune globulins for use in those infections in which they were shown to be effective. These preparations should not be unduly expensive if fractionation was on a large scale, since the blood would be given free; immune globulin did not, apparently, transmit hepatitis. The most useful vaccines in infections caused by intracellular parasites, such as contagious abortion of cattle, tuberculosis, smallpox, and yellow fever, were living vaccines.

Dr. A. FELIX, F.R.S., confirmed the rising incidence of relapse and reinfection in enteric fever since the introduction of chloramphenicol. The rapid curtailment of the acute disease was achieved only at the expense of protection against future risk. The secondary infection was often due to a strain of a phage type different from that which caused the primary infection, and this had led workers in this country and abroad to draw the erroneous conclusion that these strains differed in their antigenic composition. However, there was no evidence of antigenic differences in the infecting strains when recurrences occurred.

Other points raised in the discussion were the complexity of immunological responses in helminth infections; the possibility that not all antibody may be equally efficient in neutralizing the effect of antigens, and that antibody produced years after immunization may be less potent than antibody produced earlier in protecting against disease. The age at which the antibody-forming mechanism became mature and capable of responding to antigenic stimuli in infants was also discussed.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

The Sickle-cell Trait and Sickle-cell Anaemia

SIR,—Much of the literature on the sickle-cell trait and sickle-cell anaemia is contradictory and confusing. With reference to the recent letters published in your columns and the interesting paper by Dr. A. C. Allison (*Journal*, February 6, p. 290) suggesting that the possession of the trait endows the fortunate bearer with a positive survival value in a hyperendemic malarial area, may I be permitted to add to the literary confusion ?

The theory of the positive survival value of the trait was evolved to explain the varying and often high incidence of the dominant sickling gene which in the heterozygous state is considered to be innocuous and in the homozygous state lethal. Allison has assumed that the homozygous theory of the inheritance of sickle-cell anaemia is correct in East Africa. I do not know if this assumption is justified. The majority of the literature from East Africa, apart from a rather neglected paper by Trowell[1] and a not entirely convincing paper by Foy *et al.*,[2] emphasizes the rarity of sickle-cell anaemia. Indeed it was stated in *Colonial Research*[3] that the condition which has been described as sickle-cell anaemia could be recognized in Uganda as being *malarial* anaemia in persons with the sickle-cell trait. I have also been led to believe that cases of sickle-cell anaemia are rarely seen in necropsy material in this part of Africa. However, if it is accepted that the homozygous theory of the inheritance of sickle-cell anaemia is correct throughout Africa, the high incidence of the trait in certain parts of Africa is difficult to explain and Allison's conclusions may possibly have provided the answer. It is interesting to speculate that the expected malaria mortality in a population in a hyperendemic malarial area (in itself a controversial subject) might be calculated from the incidence of the sickle-cell trait in the population.

Malaria is considered to be hyperendemic in the Gold Coast; the incidence of the trait in the population of the Accra district is in the region of 18% and the homozygous theory of the inheritance of sickle-cell anaemia may well be correct.[4] In 1949–50 in the Gold Coast I examined 527 children for the presence of the trait, and the blood was also examined for the presence of malarial parasites. Eighty-four exhibited the trait and malarial parasites were present in 30 (35.7%). Malarial parasites were present in 134 of the remaining 443 children (30.2%). Parasite densities were unfortunately not performed and only 200 children were of a strictly comparable group. In conjunction with Dr. M. J. Colbourne a further investigation was recently instituted and the results to date are shown in the following Table:

The Incidence of the Sickle-cell Trait and Malaria, Including Parasite Densities in 161 Children of Comparable Age Group and Social Class in Accra

	No.	Malarial Parasites	Average Parasite Density
Sickling positive	32	16 (50%)	500 c.mm.
„ negative	129	77 (60%)	1,000 „

These results are as yet inconclusive and further work will require to be done. However, the general trend of the figures is in agreement with those of Allison, although it cannot be said as yet that the sickle-cell trait partially protects against malaria in the Gold Coast. There may of course be other explanations for the varying incidence of the trait and its persistence in various parts of the world. It must be remembered that sickle-cell anaemia may be a mild disease and improve with advancing years. One of my patients was a male African aged 40 years who had five children, all bearers of the trait, who were alive and well and showed no symptoms of sickle-cell anaemia. In addition, it is recognized that women suffering from sickle-cell anaemia may still bear children although the mortality and morbidity in pregnancy may be high.[5] The suggestion of Wells and Itano[6] that there may be a quantitative as well as a qualitative inheritance of the trait is perhaps worthy of more consideration and further investigation.

One of the sickling children in the investigation discussed above, whose blood film was originally negative and was recorded as such, became ill while under observation and a peripheral blood film showed a density of 29,000 parasites per c.mm. This figure was not naturally recorded in those shown in the table and was the highest parasite density noted in the 161 children investigated. In addition, I have seen malarial pigment in the reticulo-endothelial system of children who have died from sickle-cell anaemia. Thus, although the bearer of the trait may possibly be partially protected against malaria, undoubtedly reasonably severe infestations occur. In addition it has been postulated that a malarial infection might precipitate a crisis in sickle-cell anaemia.[4] This seems a reasonable hypothesis if the malarial parasite depends on oxygen for its survival, and is borne out by the history given by those suffering from sickle-cell anaemia. There is thus the possibility that malaria may be responsible for an increased death rate in sickle-cell anaemia. Lastly, to further complicate the picture, the "sickle-cell crisis" described by Reid[7] and Edington[8] is a common finding in our necropsy material, and may I say, albeit hesitantly, that I am not entirely convinced that this type of catastrophe may not occur in the heterozygous individual and that, in making this statement, I am not entirely unsupported in the literature ?—I am, etc.,

Accra. G. M. EDINGTON.

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Neomycin in Pyogenic Skin Diseases

SIR,—The findings of Dr. R. E. Church (*Journal*, February 6, p. 314) have been further confirmed here in a recent series of 80 similar cases who have been investigated bacteriologically and treated by paired comparison—40 (series A) with 1% aureomycin in a P.M.F. base, and 40 (series N) with "nebacetin"—a preparation containing 5 mg. of neomycin and 250 units of bacitracin per g. of anhydrous ointment base. The numbers were limited by the amount of "nebacetin" available.

In the treatment of the superficial pyodermas, no significant difference was noted between the two groups. All of 30 cases of impetigo were cured within 18 days, the great majority in the first week. Twenty-six cases of infective eczematoid dermatitis were treated with only two unsatisfactory results in each series. One of these in series N showed sensitization, but whether to neomycin, bacitracin, or base could not be determined. In 14 cases of folliculitis barbae, only one failure was recorded in each group. In the treatment of sycosis barbae, however, a considerable difference in results was seen. Of 10 cases treated, the five in series N resulted in one cured, two temporarily improved, and two showing no response. Four of the five in series A were cured and remained so to a three-month follow-up—the other improved, relapsed, and later cleared with 3% terramycin ointment which recently has given comparable results in sycosis barbae to the aureomycin preparation.

The bacteriological results corresponded to Dr. Church's figures for the Sheffield area. *Staphylococci pyogenes* were isolated in all cases investigated and found to be resistant to penicillin in 49 cases (60%), to aureomycin and terramycin each in 8 (10%)—mainly the same patients—to chloramphenicol in 4 (5%), and to neomycin partially in one case only. This percentage of penicillin-resistant organisms has surprised colleagues not practising dermatology, but appears to be a general finding in other places.

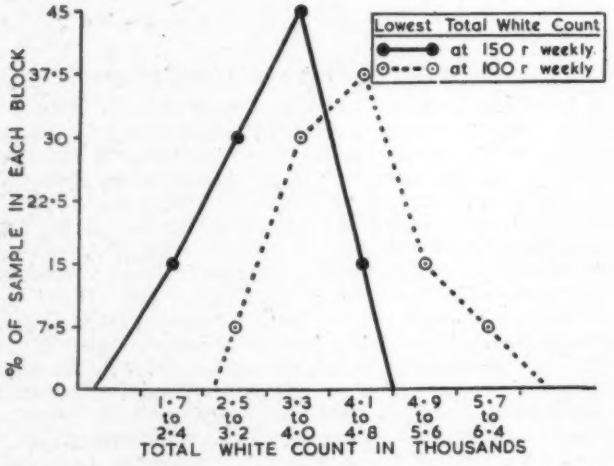
The other figures correspond roughly to the proportionate use of these antibiotics to date, and it seems therefore not unreasonable to assume that penicillin resistance will slowly but surely be matched by resistance to the other antibiotics over the next decade and that patient-sensitization—so prevalent now with penicillin—may well follow a similar course.

If then the undoubted time-saving factor justifies the local use of these antibiotics at all, neomycin, which has no systemic use, should be the drug of first choice in the superficial pyodermas for as long as these other factors of low bacterial resistance and patient-sensitization remain. Preparations of aureomycin and terramycin which have wide systemic indications at present should now be discriminately restricted to stubborn cases and deeper seated lesions of the sycosis type. But impetigo and related conditions were not regarded with grave therapeutic alarm and despondency before antibiotics were added to our repertoire, and preparations such as lotio or pasta cupra-zincica and "lin. cal. with 2% ichthammol" still cure these conditions in reasonable time and will be both acceptable to the patients and to those concerned in pruning the nation's drug bill. The nebacetin was kindly supplied by Messrs. W. R. Warner and Co. Ltd., through Dr. D. D. H. Craig.—I am, etc.,

Aberdeen. IAN W. CALDWELL.

Deep X-ray Therapy in Spondylitis

SIR,—The deep *x*-ray treatment for spondylitis, advocated by Drs. J. Sharp and E. C. Easson (*Journal*, March 13, p. 619), is very nicely shown by them to be effective and moderately safe, and the dosage of 150 r weekly for 10 weeks is, of course, less than that used in some other centres. I think, however, that no one should embark on such therapy without realizing the profound fall in the white cell count that results.



The diagram shows the lowest counts reached in a small sample of cases treated at 150 r weekly, and shows that a striking effect is still seen with a dose of 100 r weekly for 10 weeks. In a small uncontrolled series I have not found this fall in total white count, or the nausea and vomiting which also occurs, to be ameliorated by the injection intravenously of 200 mg. of mercaptamine immediately after treatment, but it is interesting that all of my subjects who were smokers were unable to smoke cigarettes for several days. If this suggestion is confirmed by further work it may be of use to would-be abstainers.—I am, etc.,

Manchester. M. B. MCEVEDY.

SIR,—Drs. J. Sharp and E. C. Easson (*Journal*, March 13, p. 619) are to be congratulated upon their excellent results obtained with *x*-ray therapy in ankylosing spondylitis. We have learned to expect such good results well presented from the Christie Hospital and Holt Radium Institute.

Two points of practical importance referred to in their methods draw comment. The first is the praiseworthy use of dosage below that used in many clinics. I have used a dosage of 1,000 r (tissue) in one week to all the affected zones in sections from the sacro-iliac joints to the top of the cervical spine. The sacro-iliac regions are treated first in one week, next the lumbo-dorsal, 20 cm. in length, then the dorsal, again 20 cm., and lastly the cervical. The results are comparable with those of Dr. Easson. By thus dividing the tissue treated constitutional upset is avoided. The second is the treatment of sacro-iliac disease in the female. I believe I was one of the first to use glancing fields for this region and would like to give particulars of a case treated in 1945 with its effects on menstruation. The right and left sacro-iliac joints were treated with 1,000 r in one week. Ionization in the rectum showed that the patient had a maximum of 100 r from both treatments. Following this she had one excessive period followed by one month's amenorrhoea and then the periods were normal until 1950, when she complained of more pain in the midline of the back. She was given the same dosage again and, in addition, 500 r to a painful area in the midline through a field 6×4 cm. directed towards the head. Following this treatment she has had irregular periods, sometimes twice a month, sometimes five months' amenorrhoea.

The object of reporting this case is to show that *x* rays in small doses can affect menstruation and also that treatment can be repeated without producing permanent amenorrhoea. This patient's periods were perfectly normal and regular before radiotherapy, and commenced at the age of 16. I realize that this is only an isolated case and any conclusions are arguable, but it is very interesting.—I am, etc.,

London, W.1. ANTHONY GREEN.

The Thyroid

SIR,—I have read your review (*Journal*, February 27, p. 503) of Mr. T. Levitt's *The Thyroid*; I have also made a careful study of the book itself. It seems to me that the reviewer did not fulfil his primary duty, which is to give a fair account of the general scope of the book. Though a reviewer's own interest may be limited, I think that he should always bear in mind the needs of the audience to which a book is addressed. Thus a surgeon would probably like to know that Mr. Levitt gives a detailed description of recommended operative procedures based on his own extensive experience. I found Mr. Levitt's account of the eye changes in exophthalmic goitre to be one of the fullest and most enlightening, and certainly the best illustrated, that I have ever come across and one which I am sure would interest many types of workers.

It seems to me regrettable that when a really important British monograph appears representing the fruit of much labour and reflection its scope should not be made abundantly clear and that the reviewer should instead take up your valuable space in discussing certain details on which his views are at variance with those of the author.—I am, etc.,

London, W.1. SAMSON WRIGHT.

Rh Antibodies and Domiciliary Midwifery

SIR,—It is dangerous to draw conclusions from small numbers of cases of haemolytic disease of the newborn, for this disease can vary in severity from an infant so mildly affected as to require no treatment to one so severely affected as to be stillborn. We estimate that the infants of 100 Rh-negative women with antibodies fall into the following categories: Rh-negative and therefore not affected, 20; Rh-positive and therefore affected, 80 (stillborn 10, requiring treatment 42, not requiring treatment 28).

If simple transfusion is the treatment used, then as many as 13 deaths might be expected, whereas practically all could be avoided by the use of exchange transfusion. In our experience in the last two years, out of 52 affected babies born at home, 11 died; 8 were seen early enough

to be treated by exchange transfusion, but 3 of these died. We believe that 2 of these 3 infants would have survived had they been born in a hospital affording special facilities. During the same two years, out of 217 affected infants born in special hospitals, only 7 died, but in only 2 of these cases was death attributable solely to haemolytic disease of the newborn. Two were liveborn hydrops foetalis and therefore not viable, while the other 3 died from causes other than haemolytic disease.

The severity of this disease cannot be predicted accurately antenatally, and even a primipara may have a severely affected infant. It is probably true that only once in a lifetime will a family doctor be faced with a baby born *in extremis* and where exchange transfusion is urgently required. But to the family concerned that infant is supremely important, as witness this extract from a father's letter received by us in response to a postal follow-up of cases not delivered in special hospitals: "... I think the baby could have been saved and it was a great loss to my wife and I, after those months of planning and preparing. We would still like to have one, *but* we would rather wait until we have some guarantee that *every effort* would be made to keep the baby alive." It remains our conviction that hospital delivery should be offered to all immunized Rh-negative women.—We are, etc.,

SHEILAGH MURRAY.
WILLIAM WALKER.

Newcastle-upon-Tyne.

Primary B. coli Peritonitis

SIR,—I came across the following unusual case recently. It would be interesting to hear of any similar cases met with by your readers.

A girl aged 4½ years was admitted as an emergency at 11.15 p.m. with a history of abdominal pain since 4 p.m. The mother stated that she was perfectly well up to that time. There had been some nausea but no vomiting. On examination the child was toxic with circumoral pallor, cold extremities, axillary temperature 103° F. (39.4° C.), and pulse 120. The throat, ears, and chest were normal. The abdomen was distended with generalized tenderness. Rigidity was most marked below the umbilicus and maximum in the right iliac fossa. A provisional diagnosis of pneumococcal peritonitis was made, but laparotomy to exclude appendicitis was decided upon. An injection of 250,000 units of penicillin was given, and the child premedicated with "nepenthe"/atropine.

A right lower paramedian incision was made. There was a film of odourless, slimy yellow pus covering the viscera below the umbilicus. The peritoneum was congested, being most marked in the pelvis. The appendix was normal except for the congestion of the outer coat; so was the pelvic colon and ileum. No primary cause was found and a specimen of pus was taken for culture. The appendix was then removed and the incision closed. The penicillin was continued post-operatively for five days. Recovery was uneventful, the temperature falling to normal on the third day by lysis. The bacteriological report was as follows: pus cells +++, Gram-negative bacilli ++, culture: *B. coli* ++++, sensitive to aureo-, chloro-, strepto-, and terramycin. The child was discharged perfectly fit on the 16th day.

As the swab was taken before removing the appendix the possibility of contamination could be excluded. I have seen many similar cases where culture of pus proved sterile, probably due to delay in plating and pneumococci being very short-lived on an ordinary swab, but the profuse growth of *B. coli* obtained here seems to justify regarding the case as one of genuine primary peritonitis due to that organism.—I am, etc.,

C. P. DE FONSEKA.

Bath.

Elastic Stump Socks

SIR,—It is well known that amputation stumps require careful early post-operative treatment so that a conical, well-healed, and durable stump can be measured and fitted with an artificial limb as quickly as possible.

I am finding elastic stump socks made from two-way stretch material, specially woven to give maximum pressure at the distal end of the stump, most useful in post-operative cases. The advantages of these elastic socks are: (1) they exert an even pressure (reduces the oedema); (2) they do not produce folds and invaginate the skin, thus leaving furrows; (3) they shape the stump in a conical manner and produce an even contour, leaving a linear scar; (4) the patient can apply and adjust the socks himself; (5) they are not cumbersome, require no bandaging, and save the time of the physiotherapist; (6) the employment of these socks prevents any injury to the stump which may occur as a result of inexpert bandaging of a stump with vascular disease.

These stump socks are made in two types, one set for above and another set for below knee amputations in three graded sizes—small, medium, and large. The small below-knee socks are also suitable for arms. They are easily washable, are economical, and can be used by the patient at night as well as by day. They are said to last for at least 18 months.—I am, etc.,

LEON GILLIS.

London, S.W.15.

A.C.T.H. and Cortisone

SIR,—Regarding the future possibilities of A.C.T.H. and cortisone, Dr. Sulzberger writes: "It is not at all venturesome to predict that, in the future, these hormones may well prove even more useful in dermatologic research than in dermatological therapy."[1] And Dr. J. T. Ingram, writing on "Stress as a Factor in Dermatology,"[2] says: "It may be that the results of treatment of skin disease by A.C.T.H. and cortisone will throw some light on the mechanism involved in skin reaction."

In 1950 an article entitled "Deficiency Patterns in Metallic Poisoning" appeared in the *B.M.J.*[3] In this Dr. W. Hughes recorded his observations on a series of cases of poisoning with heavy metals and also a number of cases of avitaminosis in which the skin lesions were very similar in type and in distribution. He drew attention to the biochemical changes resulting in the case of metal poisoning, in which the enzyme system concerned in cellular oxidation was blocked by the metallic ion having attached itself to the protein moiety. Following the discoveries of Sir Rudolph Peters these cases were successfully treated by dimercaprol, which acted by competing for the metallic ion and freeing the enzyme system.

In the cases of avitaminosis, however produced, the same enzyme system was inactivated, this time by lack of the necessary factor in the form of the vitamin, the addition of which allowed the enzyme action to proceed normally and cured the condition. Following the appropriate treatment in the two types of case, the skin lesions were seen to heal.

It is suggested that there may possibly be other patterns of skin disorders having a dual or even a multiple type of causal origin, particularly those manifestations of rather an obscure origin and mechanism which have been cured by drugs having an equally obscure action on the physiological processes of the body. There are cases of dermatitis herpetiformis which respond to sulphapyridine, others to suramin, others to neither, or to calciferol. Lupus erythematosus of the acute type will respond to A.C.T.H. and the chronic variety be unaffected by it. A rash produced by a sensitivity to penicillin with a similar distribution and appearance to an acute L.E. may also respond dramatically to A.C.T.H. Other examples will probably occur to the reader.—I am, etc.,

DOROTHY C. MACLENNAN.

Leeds.

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1 *Modern Trends in Dermatology*, 1954, p. 296, London.
2 *Practitioner*, 1954, 172, 49.
3 *British Medical Journal*, 1950, 1, 634.

Anaesthetics in Out-patient Departments

SIR,—Despite the enormous number of articles and letters about anaesthesia which have appeared recently in the *Journal*, including the report of the meeting of the Section of Anaesthetics at the Royal Society of Medicine on February 5 (*Journal*, February 20, p. 452) in regard to dental anaesthetics, I am prompted to add my own experiences in

this connexion, as I feel they may be of interest. I have given, in the last six years, over 12,000 of these from all age groups; all of which have been given in school clinics, hospital out-patient departments, or in private practice. In no cases, except in private practice, have I ever used any premedication. It would seem to me that in the clinics and hospital out-patient departments doing 20 to 30 patients in a session, and with lack of staff or suitable accommodation for recovery, this is quite impossible.

All cases have been given nitrous oxide–oxygen mixtures with supplementary trichlorethylene or ethyl chloride as available, or if necessary. No ill effects that I know of have occurred in any case. I agree with Dr. J. G. Bourne's views on premedication, but they would seem to be impracticable, and surely the use of cyclopropane as he suggests would be prohibitive from the point of view of expense. I have used all the standard machines and feel that the McKesson–Nagraf machine with trichlorethylene attachment is the most satisfactory of all. I cannot see how the use of cyclopropane, with its risks of explosion, sickness, and salivation, can be considered safer in the hands of a novice than nitrous oxide.—I am, etc.,

London, N.W.6. KENNETH W. LEON.

SIR,—Following the appearance of your leading article on this subject (*Journal*, February 27, p. 505), there has been some discussion centred mainly on the disadvantages of cyclopropane. All correspondents have failed to recognize the two main points of Dr. J. G. Bourne's thesis (*Journal*, March 13, p. 641): (1) the danger of anoxia in nitrous oxide and oxygen anaesthesia, and (2) the simplicity of Bourne's method.

My only comment on (1) is that it is well known that even a short period of anoxia during a major surgical operation contributes to shock, and yet anoxia (or hypoxia) is gaily used by all and sundry in out-patient departments, doctors' surgeries, and dental surgeries all over the country as an adjuvant to a known weak anaesthetic. Other anaesthetics have their disadvantages also. (2) The apparatus used by Bourne is simple and costs less than half the price of the standard nitrous oxide and oxygen apparatus. The method is simply learnt, and *because* cyclopropane is a powerful anaesthetic its dose can be regulated by the duration of the inhalation. The mask is removed, leaving the surgeon a quiet subject who is not cyanosed, and still giving him ample time to perform a short operation. I had the privilege of seeing Dr. Bourne's film at the Royal Society of Medicine in which he demonstrated (to me at any rate) the impossibility of maintaining anaesthesia with nitrous oxide and oxygen in the correct physiological admixture in a high proportion of cases.

With regard to Dr. H. Newton-Andrews's comment (*Journal*, March 13, p. 641) on the possibility of explosion by a spark from a difficult extraction, I would point out that a throat pack should always be used, which would minimize the risk of explosion. The time has now come for a reassessment of anaesthesia in all forms of minor surgery. In conclusion, I would recommend correspondents to re-read Dr. Bourne's original paper.[1]—I am, etc.,

London, E.17. FRANCIS J. GODDARD.

REFERENCE

[1] *Lancet*, 1952, **2**, 705.

Ion-exchange Resins

SIR,—I would like to support Professor M. L. Rosenheim's contention (*Journal*, March 27, p. 758) that ion-exchange resins are a very promising form of treatment for nephrotic oedema. We have under observation a lady aged 35 suffering from nephrosis, who was completely resistant to all types of treatment, including cortisone. The use of ion-exchange resin ("katonium") produced most satisfactory results. She has been on continuous resin therapy for close on two years, and is able to lead what is virtually a normal life. I feel, like Professor Rosenheim, that there is a definite place for these compounds in the therapy of nephrosis.—I am, etc.,

Inverness. JAMES RONALD.

Children's Nursing Unit

SIR,—I read with the greatest interest Dr. J. A. Gillet's account of the Rotherham experiment (*Journal*, March 20, p. 684). I am wondering if he has ever considered extending the benefits of such a scheme to the aged and chronic sick. Their care is becoming an increasingly grave problem and their needs bear many resemblances to those of sick children. Like them, they have a strong attachment to familiar surroundings and dependence on others for the ordinary necessities of life. If adequate care and some skilled nursing were available in the home, many patients now admitted to hospital could be discharged sooner and others would not require admission at all, thus relieving the present famine in hospital beds and the financial burden to the community which hospitalization entails. The disturbance caused by the cerebro-arteriosclerotic in a general ward need arise much less often.

The personnel of such a service would consist of homely women whose work would be supervised by the health visitor or district nurse. Such work might be made to attract old age pensioners if the present pension regulations were modified to allow women so employed to earn up to £3 per week without deduction of pension instead of the £2 at present permitted. I am aware that various schemes already exist for the help of the aged sick, but the success of the Rotherham experiment makes it an excellent model.—I am, etc.,

Tiverton. G. NICHOLSON.

SIR,—The children's nursing unit described by Dr. Jos. A. Gillet (*Journal*, March 20, p. 684) shows what can be achieved by providing an adequate domiciliary nursing service for children. Such a service could help to reduce the infant mortality rate in a way not mentioned by Dr. Gillet or in your annotation.

It is apparent that an increasing proportion of the hospital deaths in infants are occurring in babies who are admitted in a moribund or practically moribund condition. In very many of these cases the baby has been under treatment by the family practitioner. The mother has often failed to recognize a deterioration in the baby's condition or has been unable to contact the doctor, who may be out on his rounds. In other instances she has hesitated to call him because he had already arranged to visit later or the next day. Dr. Gillet's scheme, by which such babies are visited two or three times daily by a trained children's nurse, who would also be readily available for urgent visits, would do much to prevent such tragedies. Furthermore, experienced practitioners realize that many young mothers may not appreciate a deterioration in their child's condition and naturally tend to send such cases into hospital early. The knowledge that they have at their disposal a children's nursing unit would encourage them to treat such children at home, thus saving hospital beds. It is hoped that more local authorities will follow Rotherham's enlightened example.—I am, etc.,

Huddersfield. W. P. SWEETNAM.

Synopsis of Children's Diseases

SIR,—Professor Wilfrid Gaisford (*Journal*, March 27, p. 744) is undoubtedly able to distinguish a mongol from a cretin, but how many of his students are able to do so? Confusion between the two conditions is still quite common and is not confined to undergraduates. I recently saw a child of 4 years with very marked cretinism. The child had been diagnosed as a mongol in infancy by the family doctor, and this had been "confirmed" by a consultant paediatrician. No treatment had therefore been given. I think that Dr. John Rendle-Short was well justified in including a table of differential diagnosis of the two conditions in his book.—I am, etc.,

Liverpool, 12. S. E. KEIDAN.

Injection into Artery

SIR,—I wish to correct what may be a wrong impression left in the minds of some of your readers after seeing the medico-legal report in the *Journal* of March 27 (p. 766) concerning intra-arterial injections. Reading this report may make me appear to be too dogmatic.

In my evidence I divided the act of intra-arterial injection into (*a*) intra-arterial puncture—which I said was a mishap which can befall anyone—and (*b*) injection of thiopentone after arterial puncture—which I said was not a careful or skilful act. I gave four means of ascertaining whether a needle was in an artery, and said that to continue further with an injection, having perceived one or more of these signs, was not the act of an experienced person. I also used the expression "person skilled in intravenous work," avoiding the word anaesthetist. I hasten to make myself clear, for it may happen that my turn for intra-arterial puncture instead of intravenous is just around the corner.—I am, etc.,

London, N.19. O. H. BELAM.

Erythromycin

SIR,—It was with pleasure that I read your leading article (*Journal*, January 30, p. 261) saying that erythromycin had been released for use by general practitioners. It was therefore with surprise and concern that I read the letter from Dr. H. A. Evans (*Journal*, March 20, p. 702), in which he urges that erythromycin should be kept for hospital use only. An actual case history will illustrate my reason. I was called to see an active 75-year-old man, who had bilateral lobar pneumonia. He had been under observation at the local chest clinic as a tuberculosis contact. Specimens of sputum were sent for routine examination, but, as he was very ill, treatment with penicillin was started with "estopen" 500,000 units 12-hourly. Instead of the expected response, his condition deteriorated. The pathologist's reports were negative for tubercle bacilli; culture grew *N. catarrhalis* and *Streptococcus viridans*; Gram-positive cocci and Gram-negative bacilli were also present. On the fourth day I stopped the "estopen" and prescribed erythromycin—300 mg. 6-hourly. Within 24 hours there was an improvement, and by the time the chest physician saw him with me and confirmed the diagnosis he was steadily responding to treatment. After three days the dose was reduced to 300 mg. 8-hourly, and after two more days it was stopped. In all 60 tablets of erythromycin (6 g.) were given, and no side-effects were experienced by the patient. Two weeks later he attended the chest clinic, and it was reported: "This man seems to have made a remarkably good recovery. . . ."

I do not understand why Dr. Evans is prepared to give penicillin empirically, yet not other antibiotics. I agree entirely that laboratory tests for sensitivity are desirable before using *any* antibiotic, including penicillin, but in a case such as the one described here it is surely imperative to treat the patient by all available means. Otherwise the delay while awaiting sensitivity tests may lead to a very scientific report but a dead patient.

I firmly believe that a patient should be treated in his own home whenever possible, unless he requires a special treatment or technique that is available only in hospital. Apart from the near impossibility of getting a 75-year-old man into hospital, it is better for the patient and more economical to treat him in his own home. Sixty tablets of erythromycin are not so costly as three weeks' maintenance in a hospital bed. Finally—and it cannot be said often enough—the more we general practitioners treat our patients ourselves, the better will be our relationship with the public.—I am, etc.,

London, N.W.3. PHILIP HOPKINS.

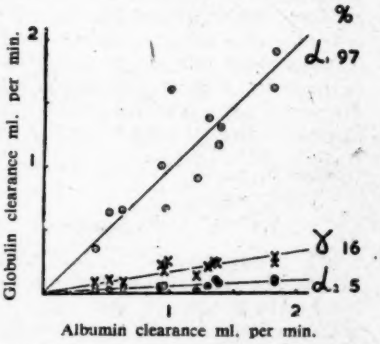
SIR,—It has been well established that erythromycin may be usefully employed in the treatment of certain infections where normally susceptible organisms have become resistant to penicillin. I must disagree strongly with Dr. H. A. Evans (*Journal*, March 20, p. 702) when he says that this fact will never concern a general practitioner.

As Dr. Evans's experience would indicate, it is probable that penicillin is the best antibiotic for staphylococcal, streptococcal, and pneumococcal infections. Moreover, I agree with him that if a patient suffering from one of these infections does not respond to penicillin, then this is an indication for laboratory testing of sensitivities. If such tests reveal the presence of penicillin-resistant organisms, does Dr. Evans consider that it is outside his province to prescribe erythromycin? It is not my experience that these tests can only be done by a hospital laboratory. In this area I have always found the Public Health Laboratory Service to be most helpful. I welcome the introduction of erythromycin for the limited purpose of dealing with the troublesome problem of penicillin-resistant infections.—I am, etc.,

Sutton Coldfield. T. A. W. PARKES.

The Nephrotic Syndrome

SIR,—We agree with Dr. F. C. Reubi (*Journal*, March 20, p. 705) that the method we adopt (*Journal*, December 26, 1953, p. 1389) for calculating tubular reabsorption of protein from the results of albumin infusions is complex, and that the graph he shows is simpler. Unfortunately the latter is fallacious, since "the different proteins [albumin and globulins] compete with each other for reabsorption." The evidence for this statement was not given fully (it will be published in detail elsewhere), but to illustrate the point the result of infusing albumin into one patient is shown on the accompanying graph. No significant changes in serum globulin concentrations followed infusion, yet the globulin clearances rose and fell in parallel with the rise and fall in albumin clearance and in serum albumin level.



The simple relationship shown in Dr. Reubi's letter is only valid where one substance of uniform molecular size and "permeability" is being reabsorbed by one tubular mechanism. When several substances of differing molecular size and permeability are being reabsorbed by the same mechanism in proportion to their concentration, and the tubular "load" of only one of them (albumin) is varied, then the increased tubular "load" of albumin will compete with the globulin for the available reabsorptive capacity and the globulin excretion will rise; hence the "clearance" (UV/P) of the globulin fractions will increase *in constant proportion* to the increase in albumin "clearance," as is seen in the graph. For example, the α_1-globulin clearance in this case remained about 97% of the albumin clearance, while the latter ranged from 0.4 to 1.7 ml./minute. The method of calculation described thus estimates the total reabsorption, which the simpler method mentioned by Dr. Reubi must therefore underestimate, and, moreover, this simpler relationship between UV_{Alb} and ($P_{Alb} \times$ g.f.r.) will be non-linear. This proportional increase in globulin clearances has now been a constant finding after seven infusions on four patients, and we feel that the theory advanced constitutes the most rational explanation of the observed facts.—We are, etc.,

J. R. SQUIRE.
Birmingham. J. HARDWICKE.

Fear of Litigation

SIR,—One statement in the medico-legal report (*Journal*, March 20, p. 709) where it is reported that Christine Bayliss was awarded £5,000 needs denial. It is the one made by Mr. R. C. Vaughan, appearing for the defendants, that: "Nurses and doctors will shut up like clams, and

you'll never get any information out of the hospital as to what is wrong with yourself, far less your child." The judge then stated: "If it were a child of mine, I would change my doctor," and Mr. Vaughan made a further statement that "one can't get facts from hospitals. They are grossly impertinent when you ask."

I am sure I am voicing the opinion of those who see after children when I say that those in charge of them in hospital try to give parents information about their children. Parents are given appointments for this purpose, told the truth, savoured albeit sometimes with hope which is scarcely justified, and encouraged to come again. This practice, which is rewarding in many ways, was in vogue before the National Health Service Act came into operation. Even then it was our duty to give "a dying pauper" as much attention as we give now to those who pay.—I am, etc.,

Rugby. R. E. SMITH.

SIR,—When an employer of labour is held responsible for an injury to his workman he alone faces criticism, and employers in general are not forced to share in the disparagement. Why, then, is it possible, on the evidence advanced in a single case, for counsel to assert that "nurses and doctors will shut up like clams and you'll never get any information out of the hospital as to what is wrong with yourself, far less your child," or, again, "One can't get facts from hospitals, they are grossly impertinent when you ask." Remarks of this kind are pounced upon by the popular press, public dissatisfaction is intensified, and we are forced to focus our interest not on the patient but upon self-protection. Surely distinguished lawyers are sufficiently in touch with our problems and difficulties to avoid such expressions of personal opinion which can only serve to damage a sister-profession and to destroy, without cause, the confidence of twenty million people.—I am, etc.,

Swansea. C. J. CELLAN-JONES.

Change of Sex

SIR,—Your annotation on "Change of Sex" (*Journal*, March 20, p. 694), coupled with the remarks of your medico-legal correspondent (p. 710), raises a serious problem. Intersexes are imperfect males or females, this imperfection being due to the disturbance of the sex-forming—or sex-differentiating—mechanism which occurs in the course of embryological development. In rarer cases the sex differentiation breaks down in the course of post-natal life following, for example, certain endocrine diseases. Although imperfect men and women, intersexes possess what has been called since the Roman jurist Ulpianus, of the third century of our era, the predominant sex.

The problem is, What is the predominant sex in an intersexual? As I pointed out in my Thomas Vicary lecture many years ago,[1] with our contemporary ideas the predominant sex is that manifested by the total personality and not that indicated by special features of nuclear genes, gonads, endocrines, or even by the balance of sexual characters. Total personality is shown by the behaviour and will of the individual. Thus, in principle, an intersexual individual has the right to demand of us to perfectionate his sex according to his choice.

The application of this principle is accepted for that class of intersexes designated as hermaphrodites ("true" or "false" according to our ridiculous terminology)—that is, in individuals who show in their genital organs and sometimes in their gonads a mixture of male and female features. Since the work of Ambroise Paré in the sixteenth century we accept to use medical and surgical procedures to perfectionate these unfortunate individuals towards the sex they will and to allow them to register accordingly. Legal complications such as marriage can be settled by the procedure of annulment. Sexual behaviour complications are not important, because, with the exception of certain cases of exhibitionism, hermaphrodites have a very weak libido. Fertility is non-existent.

The application of this principle of free choice for the other class of intersexes, the transvestites, is much more difficult. These are individuals whose genital organs and gonads are distinctly male or female but who feel they belong to the opposite sex and want to live, dress, and work like members of the opposite sex. I have noted the curious fact, however, that this does not apply to their sexual behaviour, and genuine transvestites do not generally wish to act as individuals of the opposite sex. With this group, as with the hermaphrodites, it appears that the intersexualizing process inhibits the development of the libido. In my opinion, these transvestites are as much hermaphrodites as those designated with this term, and, in fact, we find definite endocrine, genital, and other physical stigmata pointing to a definite intersexuality. They are the most unfortunate beings, leading lives of misery often terminating in suicide. We have to help them—but how? In this country psychotherapy, guidance, and help towards registration are sufficient. In Denmark Dr. Hamburger and his co-workers[2] have had the courage to apply more drastic endocrinotherapeutical and surgical measures. Can we go as far as that?

One important point: We must distinguish between the real transvestites, who are in fact hermaphrodites, and certain homosexuals, as well as patients with special obsessional neuroses, but the life history, the physical stigmata of intersexuality and the maldevelopment of the gonads and genital organs, and the unimportance of the heterosexual libido will help us. Although there are intermediary forms such differentiation is necessary and usually possible.—I am, etc.,

London, W.1. A. P. CAWADIAS.

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Elderly Psychiatric Patients

SIR,—I was impressed by the diagnostic accuracy recorded by Drs. Vera Norris and Felix Post (*Journal*, March 20, p. 675) in elderly psychiatric patients. I would have wished that the distinction between affective and arteriosclerotic illnesses had been more clearly defined. Of four patients over 65 recently discharged from this hospital suffering from mania and depression which had responded to E.C.T., all had been given a hopeless prognosis of which the patient had unfortunately become aware.

Depression in the elderly is often complicated by confusion, and mania always is, but this does not prejudice the response to E.C.T. The statement that "affective disturbance is commonly the leading symptom in cerebral arteriosclerotic dementia" may perpetuate errors. Again, the authors state: "Special inquiry was usually needed to elicit a history of fainting turns, transitory pareses, or speech disturbances; and this, even in the absence of neurological signs or patchy intellectual defects, was regarded as indicative of cerebral arteriosclerosis." This statement surely needs clarification. Fainting attacks are very common in the aged. Sheldon[1] records that 64.7% of women between 70 and 74 suffer from vertigo and 47.5% are liable to falls. Even patients who suffer from cardiovascular disease or have had strokes may also suffer from depression which can remit completely with E.C.T.

I feel the concept of arteriosclerotic dementia is based on shaky pathological and clinical criteria and the majority of cases so diagnosed are suffering from post-apoplectic dementia and mixtures of psychosis and dementia, but many recoverable illnesses are doomed by this diagnosis. Depression and mania can be fatal diseases, and early death does not necessarily mean a senile process. The points raised in this letter have been discussed at greater length by Gallinek,[2] so I will not trespass further on your space.—I am, etc.,

Sheffield. G. I. TEWFIK.

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"Antidotarie Chyrurgicall"

SIR,—As Mr. L. Jolley truly remarks (*Journal*, February 20, p. 456), the Tweed appears to be an insuperable barrier to the bibliographer. In your note on "Some More Rare Books" (*Journal*, March 20, p. 699) you say that *Childbirth, or the Happy Delivery of Women*, London, 1635, is

very rare, and only one copy, that in the British Museum, is listed in the *Short Title Catalogue*. There are three copies in the West of Scotland, one in the Royal Faculty Library, one in the Hunterian Library of Glasgow University, and one in William Smellie's Library at Lanark. The latter is historic, as it is the copy which Professor Miles Phillips had restored to Lanark after many years' sojourn in the library of the Royal College of Surgeons in Ireland. It may also interest you to know that we in the Royal Faculty and the Hunterian Museum also have the 1612 edition. The other books mentioned are easily available in one or other of the medical libraries of Scotland.—I am, etc.,

ARCHD. L. GOODALL,
Hon. Librarian,
Glasgow, C.2. Royal Faculty of Physicians and Surgeons.

Strangulated Hernia

SIR,—Dr. J. Rendle-Short and Mr. Cyril Havard (*Journal*, March 20, p. 680) have done a service in reminding us that, although nearly all herniae in infants can be reduced by conservative means, occasional cases of true strangulation and incarceration do occur. It would be interesting to know how many of their 45 cases required emergency operation, and whether they advocate early elective operation after successful reduction by conservative means. They remark that the age-incidence is remarkably constant, and that the greatest number of cases are found in the first year of life. Textbooks of surgery seldom mention the age-incidence of strangulation, and it may not be appreciated that this condition is virtually confined to infants and the middle-aged and elderly.

A year or so ago, after reflecting that I had never seen a case of strangulated inguino-femoral hernia in a young adult, I examined the case records of 100 patients admitted to Barnet General Hospital with strangulated hernia, and 100 similar cases admitted to Edgware General Hospital. The records of the latter group were obtained by the courtesy of the Medical Director, Mr. J. N. Deacon, whose remarkable records department produced the relevant data by return of post. The average age of the Barnet group was 65.8 years, and of the Edgware group 64.4 years. Even more striking is the fact that, although both hospitals serve large areas, only two patients under 40 years of age (excluding infants) were admitted to Barnet with strangulated hernia in six years, and only five such patients to Edgware in three years. No patient under 30 years of age was admitted to either hospital. Some rather obvious assumptions were confirmed by the study, among which may be mentioned the much greater risk of gangrene in a femoral hernia, and the predisposition to strangulation imposed by the wearing of a truss for inguinal hernia.

These figures are mainly of academic interest, but they may help to resolve an individual clinical problem. For example, if an inguinal hernia is first noticed during pregnancy in a young woman, the risk of disturbing the pregnancy by elective operation is probably more than the risk of strangulation during labour. In this connexion it may be of interest that no case of strangulation has complicated pregnancy or labour in the last 7,000 cases admitted to the maternity department of Barnet General Hospital.—I am, etc.,

Barnet, Herts. V. J. DOWNIE.

Aetiology of Non-specific Urethritis

SIR,—Dr. R. R. Willcox in his article (*Journal*, January 2, p. 13) dealing with the aetiology of non-specific urethritis, sees the cause of this not uncommon disease in a presence of some "virus" which has not been isolated, and remains to be discovered. In my opinion the bacteria, and even some undefined virus, are just the secondary feature, the main basing on changes of tissue. Non-specific urethritis is a common disease even in my country in recent years, and, besides that, I am observing in practice quite a considerable number of polyurias, pollakisurias, nycturias and enureses in children as well as in adults, without any aetiological grounds. In all these cases we find one constant symptom, and that is the pronounced alkalinity of urine, detectable with litmus paper, and reaching often points from *p*H 7.5–8. The alkalinity is not always present in all portions of urine, usually the morning urine being acid and the afternoon alkaline.

What may be the cause of this alkalinity, which years ago was not so often pronounced? I think there is a relative alkalinity of food due, first, to shortage of proteins owing to the second world war, and, secondly, to the overemphasizing of vegetable foodstuffs by official medicine in both our countries, in respect to a vitamin fashion. However, if we consider the alkalinity of urine as the aetiological cause of non-specific urethritis, the illness should disappear when the kidney excretion is acidified. That is really the fact. After giving 1 g. of ammonium chloride daily the disease disappears within a week. Ammonium chloride forms urea in the body, and free chlorine ions remain acidifying urine finally. Aetiological treatment would be, of course, to enlarge the level of proteins in the food.

For illustration here is one case: a 52-year-old Army colonel, who for six years suffered from a purulent discharge from his urethra, bacteriologically non-specific flora, gonococci never present. During these six years he went through all kinds of treatment: antiseptics, antibiotics, sulfadrugs, abstinency from coitus, and kurort treatment with alkaline mineral water. Finally he shifted from cavalry to artillery, without effect either. After taking the above-quoted medicine he was within a week without any discharge, and remains in good state until now—that is, after a year. He takes ammonium chloride occasionally, when he feels itching in the urethra. The puzzle remains why his wife, vegetarian as him, and many other vegetarians remain without any ill symptoms from the urinary tract.

Please excuse, dear Sir, my bad English—it is now over 15 years since I was a short while in your country, and a year in the U.S.A. I am very indebted to the extraordinary high level of your *B.M.J.*, which is the best one from all Western papers dealing with general medicine.—I am, etc.,

Brno, Czechoslovakia. JIRI STEFL.

Poliomyelitis

SIR,—In your annotation on immunization against poliomyelitis (*Journal*, March 13, p. 635) you speak of poliomyelitis as "a disease with so low an attack rate . . . and one of which the dissemination is so mysterious that we cannot know whether or when any given individual has been exposed to infection." Can you really say that the attack rate is low or the whether and when of infection mysterious when we have repeated examples of exactly the reverse? As many as 4 out of 13 babies infected in a maternity home,[1] 16 out of 120 inhabitants on a housing estate,[2,3] 3 cases in the infant class of a school of 22 pupils,[4] 4 cases in a children's hospital ward,[5] 12 cases in a school of 73 pupils,[6] 6 cases (1 fatal) in a school of 65 boarders,[8] numerous examples of multiple infection in a family,[7,8] etc.

A great problem is often made of the odd sporadic cases although these form only a small minority of the annual notifications; the majority of cases occur in local outbreaks[9] and so, far from being distributed over the total population of the affected area, are confined to those associated with an infected school, nursery, hospital, family, or other group, in which the individual's chance of developing the disease and/or transmitting the infection may be a hundred or more times that of the rest of the local population. Thus in the epidemic in Rye in 1952[10] 17 of the 23 cases were either pupils or home contacts of pupils of the Rye Elementary School, and five of the remaining six cases were indirect contacts.

The tragedy is that the mumbo-jumbo of "mysterious dissemination" of the virus—more worthy of the pre-Pasteur days of "spontaneous generation" than of the present day—is preventing our using the only effective weapon we have against the disease; namely, prevention of transmission of the virus by the enforcement of quarantine restrictions. "Prevention," one is tempted to urge, "is better than cure." But in poliomyelitis we have no cure. Wrong treatment can certainly add to the disaster, but we must recognize that the results of even the best treatment are pathetically insignificant compared on the one hand with what we might do by prevention, and on the other with the

"hard core" of disablement and death which persists in spite of all our efforts. The final score of the 23 cases at Rye was three deaths (two deaths were extremely rapid and one occurred before treatment could even be summoned), two very severely paralysed, three severely paralysed, and four moderately paralysed, giving a combined death and disablement rate of 50%. In addition, two families (four young children) lost their mothers. This score is typical and we cannot afford to continue to ignore it.

It is my firm belief, based on careful study of the records of epidemics and the histories of individual patients, that routine isolation of contacts of poliomyelitis cases might very well prevent *at least* 50% of the cases notified annually in this country.[11] In addition, it would rid us of the danger of experiencing the severe epidemics which we have seen occurring in other countries. It is time that we recognized poliomyelitis as a dangerous infectious disease which can disrupt family and national life and that we took the necessary measures to prevent it.

In closing might I refer you back to your own leading article on the same subject.[12] In it you say "we must regard the family as an "infected unit," and "it is clear that people inside the family infect people outside." Replace your "'family" by "family and/or institution," and you have stated the problem and indicated its solution.—I am, etc.,

Oxford. MARGARET AGERHOLM.

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Accurate Equivalents

SIR,—May I make a plea for a greater sense of proportion, and less blind acceptance of arithmetic, both in assessing results of treatment and in conversion of figures from one system of units to another? This was prompted by the recent statement in your *Journal* that "Two pints (1.1 l.) were transfused . . ." and that out of 34 mothers in a certain group, 27 (79%) gave birth, etc.

Now I question whether the translation of pints into (I presume) litres, while desirable, would not gain in clarity more than it lost in accuracy by rendering as "Two pints (1 litre)"; and has the figure of 79% any significance? In fact 27 out of 34 is as near 80% as it is to 79%, and a result differing by one case (76.5% or 82.5%) would be surely not unlikely? Nor would it affect the author's argument. This is not in any way intended as a criticism of the letters quoted, for they are but representative of a host of authors who have less understanding than they have fear of inaccuracy—I once met a doctor who proposed quoting a figure of 50% in a paper, out of two cases.

Where lies the logic of stating, as is often written, that a baby's birth weight is "7½ lb. (3.4 kg.)"? To call it 3.5 or even 3½ kg. would still be right to the nearest quarter-pound. I am on thinner ice when I criticize equivalents in dosage, but I pick at random: "Galla *B.P.C.*, dose 10 to 20 gr.—0.6 to 1.2 grammes" and "Acidum hydrochloricum dilutum *B.P.*, dose 2 to 5 min.—0.12 to 0.3 ml." What harm (or measurable loss of effect) would come from a dose range for galls of 0.5 to 1.0 gramme, or for hydrocyanic acid of 0.1 to 0.3 ml.? And who ever measured 0.12 ml. anyway?—I am, etc.,

Acle, Norfolk. J. F. FILBEE.

*** The authors of papers are responsible for inserting percentages of the kind criticized by Dr. Filbee; we are responsible for the metric equivalents. These are not intended to guide the practice of the foreign reader but to serve as a close, though not a pedantic, translation for him of British weights and measures.—ED., *B.M.J.*

Abbreviations

SIR,—I would like to express agreement with Dr. C. H. Morhouse of the U.S.A.F. Hospital, Arrington, Herts (*Journal*, March 20, p. 703). Abbreviations have become a necessity, but are sometimes difficult to interpret—e.g., A.P.T. can mean alum precipitated toxoid, artificial pneumothorax or, to the M.O.H. (medical officer of health or Ministry of Health), administrative, professional, and technical staff. Specialist reports often contain abbreviations with which their colleagues may not be familiar—e.g., O.A., osteoarthritis; A.F.B., acid-fast bacillus; C.S.O.M., chronic suppurative otitis media; and few would guess that O.B.E. may refer to oil, bath, and enema. Again, students from one hospital use P.R. to denote an examination by the rectum, whereas R.E. is used in another.

May I suggest that a list of recognized abbreviations be compiled by the B.M.A. (British Medical Association—not the less well known Bald Men's Association), the M.O.H. (Ministry of Health), or even by the W.H.O. (World Health Organization).—I am, etc.,

Plymouth. O. LL. LANDER.

POINTS FROM LETTERS

Teach Bacteriology in Schools

Dr. ARTHUR TURNBULL (Glasgow) writes: Is it not high time that bacteriology should be taught in British schools? A few microscopes in every school, with culture slides of various germs, would enable our boys and girls to see these interesting organisms for themselves, and once seen by them never forgotten. Our youth would become bacteriologically minded, and a great move forwards in the intelligent prevention, early recognition, and national cure of disease would accrue. For seeing is believing to cinema-minded children. In addition, the practical application of television to schoolchildren's education might well include direct teleray study of the different races of micro-organisms, those real enemies of mankind.

Prostatic Obstruction Due to Ephedrine

Dr. H. J. WRIGHT (Nuneaton) writes: In the course of the past six years in general practice I have found the ephedrine given to elderly male asthmatics in therapeutic doses caused symptoms of prostatic obstruction in at least four cases. No previous history of dysuria was elicited, but rectal examination in each case showed moderate prostatic enlargement. Within a day or two of withdrawing the ephedrine the difficulty in micturition disappeared; in no case was catheterization or admission to hospital required. I find no reference in a standard textbook of pharmacology to any effect of ephedrine upon bladder function, and should be interested to know with what degree of frequency this phenomenon may have been observed by others.

Presternal Oedema in Mumps

Dr. JOHANNA SPINNER (Mitcham, Surrey) writes: Referring to your recent reports on presternal oedema (*Journal*, January 30, p. 258, and February 27, p. 518), the mother of a little girl who was ill with mumps asked me to see her as "the swelling seemed to be on the top part of her chest as well." This child had a marked presternal oedema, which was slightly painful on palpation. I suppose this symptom is often overlooked and not as rare as one would think.

Second Attack of Chicken-pox

Dr. J. I. LYONS (Heston, Middlesex) writes: During the present winter I have been called to a number of cases of a second attack of varicella, a substantial proportion occurring in adults. The illness is accompanied with pyrexia of up to 102° F. (38.9° C.) and subsides within 48 hours. Hitherto, one has regarded a recurrence of the condition as being very rare, sufficient to regard as questionable the diagnosis of the first attack. It would be of interest to know whether other practitioners are encountering similar cases, and any explanation of this phenomenon.

Smoking and Lung Cancer

Mr. ANTHONY C. PEARSON (Great Baddow, Essex) writes: The quality of cigarette tobacco and cigarette paper in France differs from that in England, and it would be of interest to know if the increased incidence of lung cancer in France compares with that in this country.

Obituary

Sir FRANK COLYER, LL.D., F.R.C.S.

Sir Frank Colyer, who died on March 30 at the age of 87, was not only a dental surgeon of the highest reputation and an authority on human and comparative odontology, but a leading historian on the subject. For something like 50 years he was curator of the odontological museum of the Royal Dental Hospital, formerly housed in Hanover Square, but later at the Royal College of Surgeons in Lincoln's Inn Fields. His discourses on the specimens in this collection were always fascinating, and nothing delighted him more than to demonstrate them to appreciative visitors.

Born in 1866, James Frank Colyer was trained at Charing Cross Hospital and the Royal Dental Hospital, with both of which he remained associated for the rest of his life, in later years in a consultative capacity. He took the L.D.S. diploma of the Royal College of Surgeons in 1887, and after holding various house appointments at the Royal Dental Hospital he was appointed surgeon there and held for five years the office of Dean. In 1893 he was elected dental surgeon to Charing Cross Hospital. Other hospitals to which he gave his services included the Croydon War Hospital and Queen's Hospital, Sidcup. He served the Ministry of Pensions as honorary consulting dental surgeon. Colyer was the author of several authoritative books on his specialty. His textbook *Dental Surgery and Pathology*, which he wrote with Mr. Evelyn Sprawson, ran through eight editions. He also published in 1936 a work entitled *Variations and Diseases of Teeth in Animals*. A well-known historical book of his was on John Hunter's work in odontology. To him, as to all connected with the Royal College of Surgeons, the damage done to the museum by the air raid in 1941 came as a great blow. But, although he was already 75 years of age, he set himself to the task of salvage and repair and also continued his work on a catalogue of old instruments for dental extraction, on which he published a book as recently as 1952.

Among both the dental and the medical professions Sir Frank Colyer was a greatly liked figure. He was made F.R.C.S. in 1916 and F.D.S. in 1947; Bristol University made him Hon. LL.D. in 1933. He was knighted in 1920. He had been secretary and editor for the old Odontological Society of Great Britain, which in 1907 became the Odontological Section of the Royal Society of Medicine, and of that Section he was President in 1919. In 1932 he became the first President of the British Society of Dental Surgeons, and in the same year at the Centenary Meeting of the British Medical Association he was Vice-President of the Section of Comparative Medicine. He was elected an Honorary Member of the British Dental Association and he was a corresponding member of dental societies in Belgium and Italy.

He is survived by a son and a daughter. Lady Colyer died in 1950 after 55 years of marriage.

S. C. GUPTA, M.B., F.R.C.S.Ed.

Professor S. C. Gupta, professor of general surgery in the Medical College of Bengal, died on January 31 after a short illness. He was 50 years of age.

Subodh Chandra Gupta was born of poor parents on June 10, 1903. As a medical student he had a brilliant career at Calcutta University, and in 1927 was placed first in order of merit among the successful candidates for the degree of M.B. Soon after graduation he entered the Bengal Medical Service and subsequently worked at a number of hospitals in the province. In 1945 he was appointed civil surgeon and came to the United Kingdom on study leave, obtaining the F.R.C.S.Ed. in the following year. After his return to India he was appointed professor of surgery at the Lake Medical College, Calcutta. He also became presidency surgeon and a member of the standing Medical Board of the West Bengal Government. It was only last year that he took up the appointment of professor of general surgery in the Medical College of Bengal, and by his death the University has lost a good teacher and Calcutta one of its finest surgeons.

Professor Gupta was greatly respected by all who knew him. Very generous to the poor, his hospitable nature had a touch of the Victorian age about it. He is survived by a widow, two sons, and three daughters.

E. H. M. MILLIGAN, M.D., D.P.H.

Dr. E. H. M. Milligan, formerly medical officer of health for the borough of Glossop, died on March 21 at the age of 75.

Ernest Henry Marcus Milligan was born at Belfast on October 13, 1878, the son of S. F. Milligan, M.R.I.A. He was educated at the Methodist and Campbell Colleges, Belfast, and pursued his medical studies at the old Queen's College, Belfast, and at Trinity College, Dublin. He obtained the Irish conjoint diplomas in 1906, graduating M.B., B.Ch. from the former Royal University of Ireland in the same year. Four years later he was granted the M.D. by the recently established Queen's University of Belfast; in 1911 he obtained the Dublin D.P.H. Dr. Milligan was resident medical officer at the Northern Ireland Fever Hospital, Purdysburn, Belfast, from 1906 to 1908. Three years after relinquishing that post he became medical officer of health for Long Eaton, in Derbyshire. In 1917 he moved to Bath as school medical officer, and after three years there he became the first whole-time medical officer and school medical officer for Glossop. On retiring from these offices in 1946 he became a medical officer under the Ministry of Health.

The people of Glossop have good reason to remember the name of Dr. Milligan. For 26 years he worked unceasingly to better the living conditions in the town and so to improve the health of the community. In 1920 the occupants of 2,864 houses were obliged to deposit their refuse in ashpits; 20 years later only 30 were without the more sanitary ash-bin; and over the same period he saw to it that 2,512 pail-closets were replaced by water-closets. From the one small child-welfare clinic of 1920 he developed a series of well-equipped and well-staffed clinics; the health of children became his chief concern. He also bent his energies to improving the water supply. At the request of the county medical officer of health he undertook a campaign against tuberculosis, the death rate from the disease in Glossop making the town a black spot in the county. A pioneer of immunization against diphtheria, he brought about a sharp fall in the number of deaths from this disease: in his last annual report (1945) as medical officer he was able to state that no child in Glossop had died from diphtheria in the previous eight years.

Dr. Milligan was more widely known for his work on nutrition, especially during the last war. During 1941–2 he assisted the Ministry of Health in a vitamin-

feeding test carried out in Ipswich, Glossop, and London. Between July, 1940, and July, 1942, with Dr. Lewis Faning he investigated the rate of growth of children under one year, attributing the reasonably satisfactory result to the provision by the Government of milk and vitamins for expectant mothers and infants. Comparing the heights and weights of schoolchildren in 1934 and 1944, Dr. Milligan found an improvement in the latter year in the average mean weights of boys of 12 to 14 years of age. One of his last investigations was into the haemoglobin levels of pregnant women, and with Dr. H. E. Magee he published a paper on this in the *British Medical Journal* of December 1, 1951.

Dr. Milligan took an active part in B.M.A. affairs, being honorary secretary to the Glossop Division from 1929 to 1939 and president of the Derbyshire Branch from 1938 to 1939. After his retirement he was in 1946 elected as a Labour member to the Glossop Town Council, resigning from it on account of ill-health in 1949. Apart from his contributions to professional journals, he collaborated with his son-in-law in writing plays, a number of which were broadcast by the B.B.C. He leaves a wife and three daughters, to whom the sympathy of his colleagues is extended in their loss.

Dr. J. ARTHUR REES, who was one of the best-known medical practitioners in North Cardiganshire and the last of the older generation there, died at Aberystwyth on January 12 in his 84th year. John Arthur Rees was born on August 1, 1870, the son of a farmer, David Rees, J.P., and was educated at one of the local academies, the University College of Wales, Aberystwyth, and at Edinburgh University, where he graduated M.B., C.M. in 1896. After graduation, he worked as an assistant in London, and then at Pontycymmer, Glamorganshire, where he distinguished himself in the Llest colliery disaster; he bought a practice in his native village of Llanilar in 1900. Although he moved to the nearby town of Aberystwyth in 1916, he had substantially the same practice until he retired in 1952. He had thus practised in his native district for an unbroken period of 52 years, which fact and the changes he had seen in his working life were widely commented upon at the time of his retirement. Dr. Rees was a Welsh country practitioner of the old school, who knew and was known by everybody throughout a wide and scattered area. In all his 52 years of practice his entire holidays amounted to a month, of which one week was spent at a postgraduate school at Cardiff, and for 43 years he did not have a day's illness. His work was his hobby, and the practice of medicine, often in trying conditions, was truly his whole life. He was of the best type of family physician, not without his little eccentricities, and was to be seen for over half a century on either his bicycle or his Welsh cob, then on motorcycles, and later in a series of cars which bore evidence of the difficulties of reaching his more inaccessible patients. In his younger days Dr. Rees was a great sportsman. He enjoyed walking, shooting, rowing, and swimming, and he had played football for the Aberystwyth college's first eleven and first fifteen, and for the first fifteen at Edinburgh. Up to the age of 70 his normal habit was to plunge into the sea about 8 a.m. daily from Easter to October each year. Increasing blindness made him retire in December, 1952, and he was totally blind for the last year of his life, which affliction emptied life of much of its savour for him. Dr. Rees had held many appointments in the district, including those of medical officer of health, medical officer to the old board of guardians, and medical officer to the Bronglais Hospital for 43 years. Members of the medical profession, officials of local bodies, clergy and ministers, and hundreds of patients attended the funeral service at Llanilar church. He leaves a widow, a daughter, and two sons.

Dr. JAMES T. MCGLASSON, who died at Edinburgh on January 24, will be remembered as a conscientious and kindly general practitioner in the Canonbie area of Dumfriesshire. Dr. McGlasson was born at Eastriggs, Dumfriesshire, on June 14, 1901. He graduated M.B., Ch.B. at Edinburgh University in 1925, and, after six months at Stockton Infirmary and a year of assistantship at Pontefract, he spent two years as assistant to the late Dr. R. H. Watt, Langholm. He took up practice in Canonbie in 1929, where his warm-hearted humanity endeared him to his many friends and patients. In addition to running an extremely wide and busy practice Dr. McGlasson found time to take an interest in many of the social activities of the district. He was an ardent horticulturist and apiarist, and in these capacities he was chairman for many years of the Canonbie Horticultural and Crafts Society. He was actively associated with the Canonbie Drama Club and with the local branch of the British Red Cross Society. He also took a keen interest in the Langholm Rugby Club, and both of his sons are playing members. Dr. McGlasson was an extremely active member of the Dumfries and Galloway Division of the B.M.A. In the 1949–50 session he was Deputy Representative to the Annual Representative Meeting, and in the following year he was appointed Representative, which post he held until his decease. He was chairman of the Dumfries and Galloway Division in 1952–3, and was secretary to the Border Counties Branch from 1949 until his death. He was also secretary of the Dumfries and Galloway Division of the British Medical Guild. Dr. McGlasson filled all these appointments with enthusiasm and efficiency. These many interests made him an extremely busy man, and yet he always found time for a cheerful word to a friend or patient and was untiring in his efforts on their behalf. The sympathy of us all goes to his widow, sons, and daughters. He will be greatly missed.—T. M. S. C.

Professor KLOTHILDE GOLLWITZER-MEIER, one of the leading medical research workers in Germany, died at Hamburg on March 2 at the age of 59. She was born at Wolnzach, Upper Bavaria, on October 29, 1894, and studied medicine at Munich, where she graduated in 1919. After holding assistant posts at Halle, Greifswald, and Frankfurt, she was senior physician, under Volhard, at the university clinic in Frankfurt. During 1929–32 she was chief physician of the in-patient department of Hildegard Hospital, Berlin, and then became extra professor of pharmacology and pathological physiology at the Balneological Institute, University of Hamburg. From 1945 until her death she was director of the Institute for Experimental Pharmacology and Balneology at Hamburg. Professor Gollwitzer-Meier published important papers on the control of the circulation, acid-base balance, and mineral metabolism, and for her experimental work on veins she achieved an international reputation. She married Professor Dr. Christian Kroetz, director of the General Hospital, Hamburg-Bergedorf, and he survives her.

Dr. R. N. DEANE, who died suddenly on February 20, at the early age of 56, had been in practice in Croydon for 27 years. He was one of the best-known doctors in the borough, and his loss leaves a gap which it will be hard indeed to fill. Reginald Neville Deane was born on April 11, 1897, and received his medical education at Queen's University, Belfast, where he graduated M.B., B.Ch. in 1919, taking first place in surgery in his final examination. Electing to enter general practice, he was conspicuously successful, building up a large practice, so that at the time of his death he had two partners. In addition he was one of the first who availed himself of the trainee assistant scheme, with the happiest results. But his success was very much more than material. He stood in the direct line of the best general practitioners of the past, and so became dearly loved by his patients, to whom he was always as much a friend as a doctor. He was an extremely busy man, but though, apart from his practice, he found time for various hobbies,

he always had some to spare to give help to any who were in need of it. To his fellow practitioners he was best known for his interest in medical politics. During the war he was an assiduous member of the local medical war committee, where, as in all committees, his immediate grasp of the essential of any problem was of immense service. He was never afraid to take an unpopular line and was a staunch advocate of the National Health Service. He became an original member of the Croydon Executive Council, and was chairman of the Croydon Local Medical Committee at the time of his death, a position he had filled with conspicuous ability since 1949. But apart from these things he will be remembered with affection by his colleagues as a genial and kindly host, always friendly and optimistic and always full of plans and of energy to carry them into effect. He was widely read, an able mathematician, a country-lover, and no mean inventor. We shall not easily see his like again. We can only guess at the gap which will be left in the lives of his widow and stepson, and offer them our sympathy.—J. N. H.

Dr. JOHN CUMMING died at his home at Sutton-on-Hull, East Yorkshire, on March 3 at the age of 81. He had been in practice at Hull for just over fifty years and he had continued to visit his patients until eight months ago, when a painful illness compelled him to give up. John Cumming was born on October 25, 1872, and was educated at Glasgow High School and at Glasgow University, where he graduated M.B., C.M. in 1895. Before settling at Hull early in the present century, he served for a period as a ship surgeon. In 1911 he decided to remain outside panel practice, and throughout his medical life built up and retained an extensive and busy private practice. For many years he was chief surgeon to the Hull city police until he retired from the post in 1938. During the last war, however, he was recalled to serve again in that capacity and even after the war he retained his interest in medico-legal work. He was the medical examiner for superannuation for the Hull education authority, as well as medical referee for assurance companies.

R. R. S. writes : John Cumming was a well-known figure in the medical life of Hull. His sturdy, native independent spirit kept him outside both the panel and the National Health Service. He was the family doctor in the old tradition, and in that tradition he retained the trust and affection of his patients through almost four generations. Because of his many Glasgow associations, he was especially proud of his presidency of the Hull and District Glasgow University Graduates' Association.

Dr. W. F. UMNEY, consulting physician to the old South-Eastern Hospital for Children, died at his home at Beckenham on March 3 at the age of 87. William Francis Umney was born in London on August 17, 1866, and from the Merchant Taylors School entered St. Thomas's Hospital with a scholarship in 1885. He qualified M.R.C.S., L.R.C.P. in 1890, taking the London M.B. in the following year with honours in medicine and obstetric medicine, and proceeding to the M.D. in 1892. He held a number of house posts at St. Thomas's and then became resident clinical assistant at the Bethlem Royal Hospital ; while there he obtained the certificate of the Royal Medico-Psychological Association in 1892. An enthusiastic cricketer in his younger days, he was a member of the Merchant Taylors eleven from 1883 to 1885, being captain in his final year. He also played for St. Thomas's for four years and was captain in his last two years, in one of which, 1889, St. Thomas's won the inter-hospitals cup. The United Hospitals cricket team also called on his services and he frequently captained the side. In 1893 he settled in practice at Sydenham, and almost at once he was appointed physician to the South-Eastern Hospital for Children (now the Children's Hospital) and medical officer to one of the districts of the London County Council. He held these appointments until 1928, when he was obliged to retire through failing eyesight. He was then made honorary consulting physician to the hospital. For a few years after starting practice he played a good deal of cricket for a local club and was top of the bowling averages in several seasons. When war broke out in 1914 he formed and trained a voluntary aid detachment of Sydenham ladies, which became V.A.D. 142, Kent, and of which he was medical officer for four years.

Mr. CHARLES MONTAGU POWER, who died on March 6 at the age of 64, became secretary of the Westminster Hospital in 1921, and from then on he was closely concerned with the planning of the new hospital, medical school, and nurses' home. The building committee, at which plans for the new buildings were discussed, soon discovered that in Mr. Power they had a secretary possessing not only a wide knowledge of hospital requirements but also one with the tact and ability to sort out the demands for space which were made by the various sections of the hospital. Years later he supervised the arrangements for the opening of, first, the new nurses's home by the late Queen Mary in March, 1938, then the new medical school by the Earl of Athlone in May, 1938, and, finally, the new hospital in April, 1939, when King George VI performed the ceremony. Mr. Power served in the first world war, was mentioned in dispatches, and in 1917 was awarded the Military Cross. In the last war he was inspector of hospitals and convalescent homes in the home counties, and his work for the Emergency Medical Service, the British Red Cross Society, and Lady Churchill's Aid-to-Russia Fund received official recognition in 1945, when he was appointed O.B.E. Earlier, his election to the presidency of the Institute of Hospital Administrators in 1937–8 was an indication of the admiration in which he was held by his colleagues in the same field of activities. He is survived by a widow and two daughters.

Mr. J. E. KILVERT, who died at his home at Derby on March 10 at the age of 78, was in practice there from the beginning of the century. John Ellis Kilvert was born on May 30, 1875, in India, where his father was a district commissioner. He received his medical education at St. Thomas's Hospital, qualifying M.R.C.S., L.R.C.P. in 1898. Among the hospital appointments he held were those of house-surgeon and ophthalmic house-surgeon at St. Thomas's, clinical assistant at the Evelina Hospital for Sick Children, and house-surgeon at the Derbyshire Royal Infirmary, where his abilities were soon appreciated. In 1903 he joined one of the honorary physicians as partner in general practice, thus following a tradition which was not without merit ; at that time the visiting staffs of such hospitals were all in general practice. In 1906 he was appointed honorary assistant surgeon, and he continued as one of the visiting surgeons until 1940. In the first world war, when two of the honorary surgeons were abroad on active service, he dealt with an immense amount of work, including the surgical care of wounded soldiers, work which was accepted as part of the honorary duties of the staff. For his wartime services he was appointed O.B.E. in 1920. In his later years he gave much time to the administrative side of the Infirmary, to which his professional life was devoted, and he made many friends in all departments. In general practice throughout the whole of his active years, which continued until a year or two ago, he was renowned for his clinical acumen, and for the trouble he took in caring for his patients. To many of them he showed a generosity which was private and kindly, and a very wide circle remember him with gratitude. For many years he was the local secretary of Epsom College. Mr. Kilvert had few hobbies, but he had read widely and had a considerable knowledge, among other things, of criminal trials. When he started in practice the partnership relied on horse transport, but in 1906 he bought his first motor-car—of seven horse-power, with one cylinder. Mr. Kilvert is survived by his widow, who before their marriage nearly fifty years ago was a sister at the Derbyshire Royal Infirmary.—H. B.

DR. CHARLES VISGER, who was in practice at Clevedon, Somerset, for very many years, died at his daughter's home at Chippenham, Wiltshire, on March 21 after a short illness. Charles Visger was born on February 28, 1875, and qualified M.R.C.S., L.R.C.P. from University College Hospital, London, in 1901. After qualification he held house appointments at University College Hospital, the Beckett Hospital, Barnsley, and the Victoria Hospital for Children, Chelsea. He then joined the late Dr. Theodore Davis in partnership at Clevedon, where he succeeded to a large general practice, in which he continued until a few weeks of his death at the age of 79. During the first world war Dr. Visger played a prominent part in the organization of a military hospital at Clevedon, work for which he was appointed O.B.E. in 1920. In the last war he was actively associated with a local maternity hospital to which expectant mothers from the more thickly populated areas were admitted under the evacuation scheme. He was a trustee of the Stoke Park Colony and the Burden Neurological Institute, and medical officer to the local cottage hospital and certifying factory surgeon for the district. A member of the British Medical Association for nearly 50 years, he was chairman of the Bristol Division in 1926–7. From his early days at Clevedon Dr. Visger identified himself with many local interests, especially cricket, tennis, and golf. He was also a devout churchman and was a sidesman and a member of the council of the parish church of St. Andrew's at Clevedon, to which he was deeply attached. The large congregation at the funeral service at the parish church bore ample testimony to the esteem and affection in which he was held. His wife died in 1914, and he lost his son a year earlier. He is survived by his daughter, to whom the sympathy of his many friends and patients is extended.—G. M.

Dr. MYLES PATRICK MORIARTY died at Blackburn, Lancashire, on March 25 at the age of 53. Born at Dublin on November 9, 1900, he was educated at Belvedere College and University College, Dublin, where he graduated M.B., Ch.B. in 1925, after a brilliant career as a student. In 1929 he took the D.P.H. and then came to England and practised first at Leeds and then at Luddenden Foot, Yorkshire, before settling at Blackburn in 1939.

F. C. R. and J. D. C. write: Myles Moriarty was a rare combination of high intelligence and natural charm, together with kindness and consideration. A true Irishman, he had a wit matched by few, and his touch of humour lightened many a heavy heart. He was as popular with his colleagues as he was with his patients. He took a keen interest in professional affairs and was a member of the British Medical Association and the Blackburn Local Medical Committee. He was a great reader and had an encyclopaedic knowledge of many subjects. Above all else, he was a true Christian and an example to all. Although he must have known the import of his symptoms for some time, he was careful to conceal them to avoid giving anxiety to those around him. It was not until he collapsed in harness in August of last year that the seriousness of his condition was realized. In spite of his long illness his spirit never flagged, and he retained his cheerfulness to the end. Myles Moriarty was a good doctor, a good man, and a good friend, and his loss will be felt by all who knew him. Our sympathy goes out to his widow and his seven children.

Dr. ELIZABETH CASSON writes: May I be allowed to add a few words of appreciation to your obituary (*Journal*, March 27, p. 764) of Dr. G. H. GRILLS? His enthusiasm for modern treatment led him to visit mental hospitals in Germany and Holland, and he spent a few days at the Dorset House School of Occupational Therapy in its early days at Bristol. No detail of treatment went unnoticed, to the extent of his joining a Margaret Morris Movement class of patients and students going on at the time. On his return to Chester he incorporated three large and airy occupational therapy rooms in his hospital improvements, which he named "Sandepoort," "Dorset House," etc. He gave many students opportunities for study of occupational therapy at Chester, and his work led to a rapid spread in other hospitals.

Dr. R. E. S. GIBSON died suddenly at his home at Cleethorpes, Lincolnshire on February 18, the day after his 58th birthday. Robert Ernest Stewart Gibson was the son of the late Mr. Robert Gibson, of Hamilton, Lanarkshire. During the first world war he served in the Royal Flying Corps. On demobilization he entered Glasgow University as a medical student and graduated M.B., Ch.B. in 1923. He was in practice at Newcastle-upon-Tyne, Kidderminster, Cambridge, Bideford, and Westward Ho, before he finally settled at Cleethorpes early in 1935.

E. A. R. writes: Dr. R. E. S. Gibson will be remembered by many Glasgow graduates as president of the Students' Union in the vintage era of the Birkenhead Rectorial, and by others as one of the originals of the Royal Flying Corps. His was a ripe intelligence, fortified by wide reading and a detached, critical, and humorous survey of life. Although he had been in indifferent health for several years, his opinion was one which exercised a balancing view in local medical politics, and much of the harmony and co-operation of practitioners in the Grimsby and Cleethorpes area was due to his privately expressed views. His widow and son, who is also a graduate of Glasgow University, survive him.

We are indebted to Dr. W. PAGEL for the following appreciation of Dr. DOROTHY STOPFORD PRICE, whose obituary was printed in the *Journal* of March 6 (p. 589): Dr. Dorothy Stopford Price was outstanding as a personality and as a physician. She combined in her charming and dynamic personality vision, zeal, and the quest for a profound scientific foundation for her medical activities. Her vision led her at an early date to the recommendation and introduction, at a great financial and personal sacrifice, of B.C.G.; and her zeal made her organize and see through extensive tuberculin surveys for Ireland. Her quest for a scientific basis drove her on long and strenuous journeys in order to study the pathology of tuberculosis. She spent many hours in the post-mortem room selecting specimens for investigation. These specimens bespoke her rare gift for the detection of the essential behind the phenomena, and proved to be corner stones in our knowledge of, for example, epituberculosis, congenital tuberculosis, and the early histological changes in primary infection of the human lung (probably the earliest changes so far known). Her deep interest in her subject, associated with a rare sense of humour, made her visits to London special occasions. It was particularly inspiring, however, to see her at Dublin as the centre of a circle of distinguished medical men, young and old, highly enthusiastic for the promotion of medical knowledge and enlightenment. She will long be remembered in the organizations which she created, in her literary monuments, and above all in the memory of her grateful compatriots and her friends in all countries of the globe.

Dr. SIMEON BURT WOLBACH, emeritus professor of pathology at Harvard University, died at Sudbury, Mass., on March 18, aged 73. He was born at Grand Island, Nebraska, on July 3, 1880, and graduated M.D. at Harvard in 1903. From 1905 he held various teaching posts at Harvard, becoming Shattuck Professor of Pathology in 1922. He retired in 1947. He was noted particularly for his investigation of rickettsial infections. In 1919 he described the causal agent of Rocky Mountain spotted fever, naming it *Dermacentroxenus rickettsi*, and he was first to demonstrate its intranuclear multiplication in tick tissue. In 1920 Wolbach led an expedition to Poland to investigate epidemic typhus. His monograph on *The Etiology and Pathology of Typhus*, written with J. L. Todd and F. W. Palfrey in 1922, has become a standard work on the subject. Among other appointments held by Wolbach was that of pathologist-in-chief at the Peter Bent Brigham Hospital from 1917 to 1947.

In more recent years he was engaged in studies on vitamin deficiencies and on the effects of taking vitamin A in excess. After his retirement from his chair at Harvard he was officially connected in a consultative capacity with the U.S. Atomic Energy Commission and the Armed Forces Institute of Pathology.

Medico-Legal

E.C.T. INJURY CLAIM FAILS

A claim for damages for personal injuries, alleged to have been caused by the application of electric convulsion therapy, against the Horton Road and Coney Hill Hospitals Management Committee and the medical superintendent, Dr. F. C. Logan, made by Charles Davies, an insurance agent and cycle repairer, of Gorsley, Gloucestershire, was dismissed by Mr. Justice Hallett at Gloucester Assizes on February 17. Davies alleged that he had not been warned that the treatment might result in injury, and that the defendants had assaulted him by giving him the treatment without his consent.

Giving evidence, Davies said that in June, 1951, he suffered from insomnia and throat trouble. His doctor, Dr. K. M. Tomlinson, of Newent, sent him to see Dr. Logan at Gloucester Royal Hospital (Royal Infirmary). He saw him on August 24. He told Dr. Logan to what he attributed his throat trouble, and Dr. Logan said he thought he should have five lots of electrical treatment. Dr. Logan did not explain what the electrical treatment was. He (Davies) had no idea what sort of treatment he was going to have, but thought it was some sort of heat treatment. He had never then heard of the shock treatment. Had he been told that the treatment might result in a fracture and dislocation of bones or limbs, he would not have agreed without consulting his wife.

After describing a treatment, Davies said that one evening he saw Dr. Tomlinson, who sent him to see Dr. J. F. Bourdillon, consulting orthopaedic surgeon, Gloucester Royal Hospital. He was put into plaster on September 12. This was removed on November 9. He had been unable to work since the injury and claimed special damages of £541.

Dr. Bourdillon said that Davies had received a crush fracture of the eighth dorsal vertebra. In his opinion the injury occurred during E.C.T. When he saw Davies at a later date he thought he was making complaints which were more excessive than was justified by the nature of the injury.

Dr. Logan, in evidence, said he had been carrying out electric convulsion therapy for nearly 12 years. During that time he had carried out some 14,000 such treatments and had only experienced three cases of vertebral fractures, including this case, and six cases of jaw dislocation. He had advised five treatments of E.C.T. for Davies. He distinctly remembered telling Davies that under the treatment his muscles would go into spasms and produce violent contractions, and that there was a possible risk of fractures or of dislocation of the jaw. "At that time," said Dr. Logan, "I had had no previous cases of back injury, and there had been no case of jaw dislocation for several years." He distinctly remembered telling Davies that there was a risk, but it was a risk worth taking. He remembered saying to him that there was risk in everything, even crossing the road. Davies said he was quite prepared to undergo the treatment. In answer to the judge, Dr. Logan said relaxants had not then been introduced. He now used relaxants, but considered some small degree of muscular contraction was necessary, otherwise the treatment might as well not be given.

Fair Targets

Giving judgment, Mr. Justice Hallett said he was satisfied that Dr. Logan warned Davies of the risks of the treatment and that Davies accepted those risks. He also found that the treatment was administered carefully and efficiently in the usual and proper way. He did not think Davies was a reliable witness. He thought that any disability he had suffered since November 9, 1951, had been psychological. Davies's claim would be dismissed with costs.

With regard to costs, Mr. R. C. Hutton, representing Davies, stated that Davies was a legally aided person and that his capacity to pay any part of the legal costs was nil. Mr. J. F. Bourke said that counsel for the defendants could do nothing but complain of the circumstances. The Judge said he made no criticism of the legal aid committee, but it was obvious that this was a case of "Heads I win, tails you lose." He supposed that doctors and hospitals must regard themselves as fair targets under the legal aid system.

The Medical Protection Society instructed Messrs. Le Brasseur and Oakley to act for Dr. Logan.

Medical Notes in Parliament

Tuberculosis Precautions in Navy

A personal case of a young seaman who contracted tuberculosis while serving abroad in a frigate, referred to by Mr. Albert Roberts (Lab.) on March 30, led Commander ALLAN NOBLE, Parliamentary Secretary to the Admiralty, to describe the precautions taken generally in the Royal Navy to avoid, detect, and control the disease.

He said that they attached the greatest importance to mass radiography, which was compulsory. It had been used since 1940, and the fact that the incidence had steadily fallen probably meant that they were reaping the results of what they had been doing over the past 15 years. Compulsory radiography was carried out on all new entries. The examination was repeated annually, and it was carried out on all men before they were sent abroad. When men were in the Far East the *x*-ray examinations were conducted at six-monthly intervals instead of yearly as at home. In the event of there being a tuberculous contact, all those concerned were *x*-rayed, and there was a routine follow-up within six months. The value of certain immunity measures such as B.C.G. was being investigated. Every opportunity was taken of giving the men lectures about medicine and health, and a point was made of encouraging men with coughs and colds to seek medical advice.

Appointments for Patients

Dr. BARNET STROSS (Lab.) asked the Minister of Health on March 30 how many general practitioners saw their patients, using an appointment system; and, in view of the advantage to doctors and patients, whether he would consider circularizing all local executive committees, stating the advantages that would follow in the time that would be saved and the reduction of cross-infection. Mr. IAIN MACLEOD, Minister of Health, replied that the information was not available. It was in his view for doctors themselves, in the light of the particular circumstances of their practices, to decide how far they could use a system which seemed, when successfully organized, to have many advantages.

Disease Carriers

Mr. GEORGE THOMAS (Lab.) asked the Minister of Health on April 1 what steps he took when a person was found to be a carrier of disease, and in how many cases he had taken such action during the past 12 months. Mr. IAIN MACLEOD stated that action was a matter for the local authorities, who could require carriers of certain diseases to cease work in any occupation connected with food and drink if there was a risk of spreading infection. There was no central record of the action taken.

Scottish Hospital Staffs

Mrs. JEAN MANN (Lab.) asked the Secretary of State for Scotland on March 30 what representations he had received from hospital staffs, or from hospital boards, concerning the status and remuneration of registrars, junior and senior, and

senior hospital medical officers; and what action he proposed to prevent these staffs from leaving hospitals for general practice. Mr. JAMES STUART, Secretary of State for Scotland, said that he had received no recent representations about the status of these grades. He did not propose any action to prevent doctors from leaving hospitals for general practice or vice versa.

Colonial Service

Mr. JAMES JOHNSON (Lab.) asked the Secretary of State for the Colonies what steps he was contemplating regarding interchangeability of superannuation schemes for teachers, doctors, nurses, and similar public servants who took up service in the colonial territories. Mr. OLIVER LYTTELTON, replying on March 30, said that complete interchangeability of superannuation schemes was not possible, since nearly all colonial schemes were non-contributory and transfer values could not therefore be exchanged. Arrangements existed, however, for the preservation of the superannuation rights of Civil Servants, teachers, doctors, nurses, and local government officers who took up service in the colonial territories. Secondment from several of these home services was also possible.

Prescribed Diseases

Mr. O. PEAKE, Minister of Pensions and National Insurance, informed Dr. BARNET STROSS (Lab.) on March 29 that in 1950 about 36,000 men and 6,000 women were awarded benefit for a prescribed disease under the National Insurance (Industrial Injuries) Acts. The corresponding figures for 1951 were about 35,000 and 7,500. Dr. STROSS suggested that the figures seemed strangely small in relation to all scheduled diseases and the whole industrial population. Did it not mean that some cases, such as dermatitis, could not easily be accepted for full pensionable payments? Mr. PEAKE said that the whole question of the prescription of industrial diseases was before the Beney Committee. On the whole it was a matter for congratulation that the claims for industrial diseases were not of a large order.

£6m. for Salary Increases

Mr. IAIN MACLEOD stated in answer to Mr. A. BLENKINSOP (Lab.) on April 1 that nearly £6m. had been provided in the 1954–5 Health Service estimates for higher expenditure on wages and salaries due to advances already awarded or likely to be awarded.

School Dentists.—The Minister of Education informed Squadron Leader A. E. Cooper on March 31 that in December, 1953, there were the equivalent of 945 full-time dentists in the school dental service. The comparable number in 1952 was 850.

Vital Statistics

Scottish Returns

The preliminary return[1] for the year 1953 shows that the birth rate was 17.8 per 1,000 and was 0.4 below the average of the five preceding years. The infant mortality rate was 31 per 1,000 live births; this was the lowest ever recorded in Scotland, being 4 below the rate for 1952. The death rate was 11.5 per 1,000 and was 0.8 below the average of the five preceding years. 598 deaths were due to road transport accidents compared with 483 in 1952. Deaths from all forms of tuberculosis numbered 1,338, and 1,159 from respiratory tuberculosis. These deaths were, respectively, 274 and 250 fewer than in 1952. The number of deaths from the principal epidemic diseases was 386. These included 271 from influenza, 41 from whooping-cough, and 29 from measles. Only 2 deaths were attributed to diphtheria, the smallest number ever registered in Scotland. In 1940 and 1941 the deaths from diphtheria numbered 676 and 517 respectively. 13 deaths were attributed to acute poliomyelitis, an increase of 1 compared with 1952.

The birth rate for the December quarter of 1953 is shown in the *Quarterly Return* to have been 17.1 per 1,000 population; this was 0.1 above the rate for the preceding fourth quarter. The infant mortality rate was 32 per 1,000 registered live births and was the lowest rate recorded for any fourth quarter, being 7 below the rate for the December quarter of 1952. The general death rate, 11.3 per 1,000 population, was also the lowest recorded for any fourth quarter. 171 deaths were due to road transport accidents, an increase of 52 compared with the fourth quarter of 1952.

England and Wales in 1953

In England and Wales in 1953 the death rate from respiratory tuberculosis was 179 per million population as compared with 212 in 1952. The rate for males was 257 and for females 108 as compared with 304 and 128 in 1952. The death rate from cancer of the lung and bronchus was 343 per million population as compared with 323 in 1952. The death rate for males was 607 and for females 99 as compared with 568 and 98 in 1952. The death rate from other forms of cancer was 1,651 per million population in 1953 as compared with 1,711 in 1952. There were 522 maternal deaths, giving a death rate of 0.76 per 1,000 live and still births.

Infectious Diseases

The largest variations in the trends of infectious diseases in England and Wales during the week ending March 20 were increases in the number of notifications of 450 for whooping-cough, from 2,093 to 2,543, 123 for dysentery, from 1,001 to 1,124, and 112 for measles, from 2,213 to 2,325, and decreases of 194 for scarlet fever, from 1,476 to 1,282, and 51 for paratyphoid fever, from 96 to 45.

The number of notifications of paratyphoid fever in Wales declined from 89 to 44. The chief centres of infection were Glamorganshire 37 (Cardiff C.B. 21, the other 16 cases being returned from 8 areas), and Monmouthshire 7 (Newport C.B. 7). Durham with 1 case was the only other area with paratyphoid fever during the week.

19 cases of acute poliomyelitis were notified during the week. These were 2 fewer for paralytic and 1 fewer for non-paralytic than in the preceding week. The largest returns were 3 cases in Yorkshire West Riding and 2 cases in Devonshire, Surrey, Worcestershire, and Glamorganshire. No administrative area had more than one case.

For the third consecutive week the number of notifications of dysentery exceeded 1,000. The largest rise during the week was 67 in Leicester C.B., from 66 to 133. The chief centres of infection were Lancashire 213 (Bolton C.B. 42, Salford C.B. 33, Eccles M.B. 32, Liverpool C.B. 19, Preston C.B. 17, Manchester C.B. 16, Ormskirk U.D. 15), Leicestershire 141 (Leicester C.B. 133), London 125 (Islington 26, Lewisham 20, Shoreditch 14, Hackney 13, the remaining 52 cases were scattered through 18 boroughs), Yorkshire West Riding 111 (Dewsbury C.B. 40, Leeds C.B. 22, Bradford C.B. 17), Middlesex 92 (Southall M.B. 30, Edmonton M.B. 14, Hornsey M.B. 13, Willesden M.B. 11), Essex 86 (West Ham C.B. 28, the other 58 cases were spread over 13 administrative areas), Staffordshire 46 (Cannock U.D. 35), Norfolk 45 (Norwich C.B. 44), Warwickshire 37 (Birmingham C.B. 33), Kent 30 (Tonbridge R.D. 11), Devonshire 29 (Exeter C.B. 26), Gloucestershire 23 (Bristol C.B. 23), Nottinghamshire 23 (Nottingham C.B. 16), and Surrey 20.

The largest returns in Scotland were Glasgow 137, Edinburgh 35, and Lanark County 34.

Week Ending March 27

The notifications of infectious diseases in England and Wales during the week included pneumonia 661, scarlet fever 1,492, whooping-cough 2,553, diphtheria 14, measles 2,067, dysentery 1,315, acute poliomyelitis 24, paratyphoid fever 20, and typhoid fever 2.

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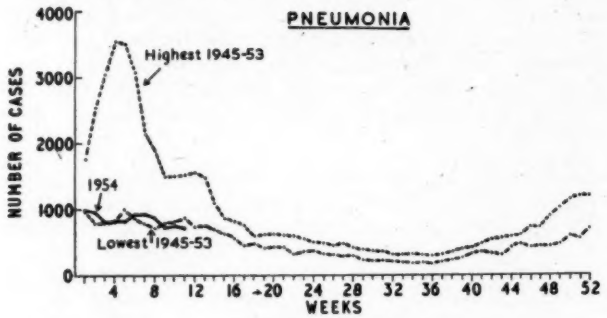
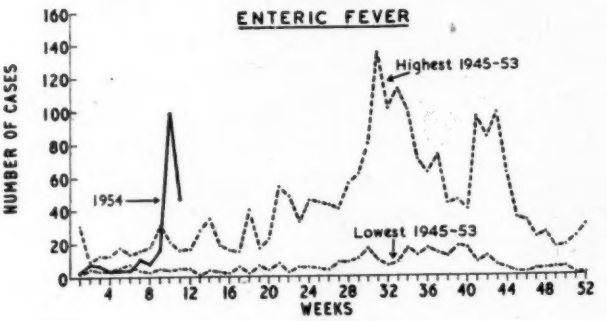
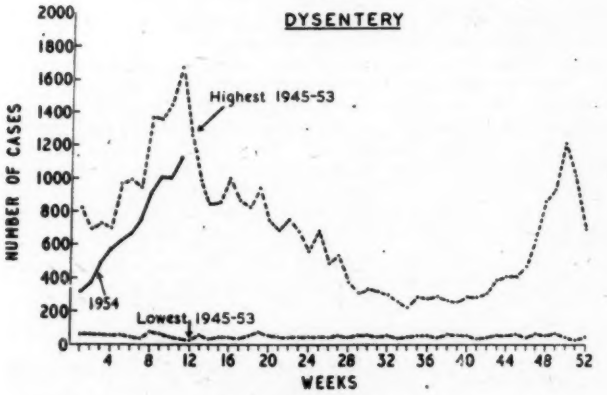
[1] *Report of the Department of Health for Scotland for the Year 1953.* H.M.S.O., 4s. 6d.

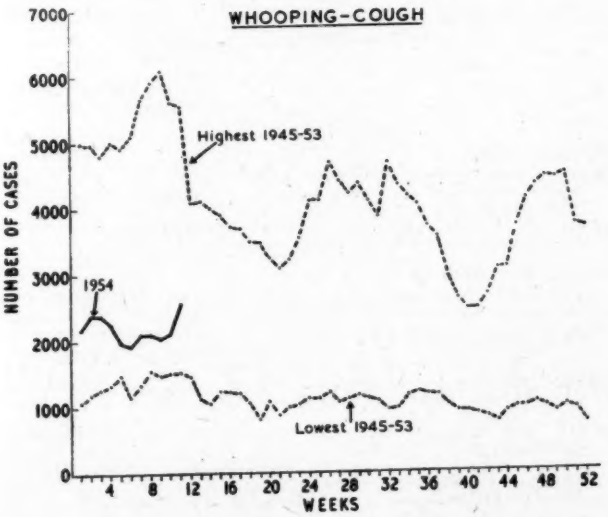
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1945–53 are shown thus - - - - - - -, the figures for 1954 thus ————. Except for the curves showing notifications in 1954, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **March 20** (No. 11) and corresponding week 1953.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	18	2	5	0	2	20	3	10	0	1
Dysentery	1,124	125	276	11	10	433	41	102	9	1
Encephalitis, acute	4	1				6	1	0	0	
Enteric fever:										
Typhoid	2	2	0	0		3	0	1		1
Paratyphoid	45		0	0		2	0	0		
Food-poisoning	159	18		3		47	11		0	
Infective enteritis or diarrhoea under 2 years				13	26				12	15
Measles*	2,325	57	107	49	428	27,226	1439	434	202	200
Meningococcal infection	36	3	11	2	1	49	6	15	1	3
Ophthalmia neonatorum	41	3	4	0	1	39	2	4	0	
Pneumonia†	704	39	220	1	7	1,044	61	347	10	4
Poliomyelitis, acute:										
Paralytic	13	0	2	0		20	0	2	1	
Non-paralytic	6	1				6	1			
Puerperal fever§	262	34	7	2		256	40	8	2	
Scarlet fever	1,282	41	144	36	32	1,625	94	178	41	47
Tuberculosis:										
Respiratory	790	97	192	16				188	28	
Non-respiratory	120	10	24	4				39	3	
Whooping-cough	2,543	104	426	37	43	3,104	202	320	23	88

DEATHS in Great Towns	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	0	0	0	0	0	1	0	1	0	0
Dysentery	1	0		0		0	0	0	0	
Encephalitis, acute		0	0		0		1			0
Enteric fever	0	0	0	0		0	0			
Infective enteritis or diarrhoea under 2 years	15	0	1	2	2	13	0	2	1	1
Influenza	25	2	3	0	0	133	16	14	0	4
Measles		0	0	0	0		1	0	0	1
Meningococcal infection		0	2				0	0		
Pneumonia	311	40	32	14	7	365	56	25	26	17
Poliomyelitis, acute	3	0			0	0				0
Scarlet fever		0	0	0	0		0	0	0	0
Tuberculosis:										
Respiratory	111	18	17	3	5	120	14	15	6	9
Non-respiratory			1	1	2		0	2	0	1
Whooping-cough	1	0	1	0	0	1	0	0	0	0
Deaths 0–1 year	241	24	39	10	18	253	28	20	12	14
Deaths (excluding stillbirths)	5,943	771	664	149	158	6,207	879	644	148	204
LIVE BIRTHS	7,953	1180	1059	245	362	8,182	1215	913	216	318
STILLBIRTHS	201	15	29			220	27	18		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Medical News

Royal College of Obstetricians and Gynaecologists.—As part of the College's silver jubilee celebrations in July four honorary fellowships will be awarded. Their recipients will be: Lord Simonds, the Lord Chancellor, who as Mr. Gavin Simonds, K.C., gave invaluable help and advice during the foundation of the College; Sir Arthur Sims, who with his family endowed the Sims-Black Travelling Professorship (named after his wife and daughter) to enable a professor to visit the Commonwealth every second year; Dr. Doris Clifton Gordon, of New Zealand, who has rendered distinguished services to obstetrics and gynaecology in her own country, in particular being instrumental in obtaining funds for the endowment of a Chair at Dunedin; and Dr. Joe V. Meigs, clinical professor of gynaecology at Harvard University, and chief gynaecologist at the Massachusetts General Hospital.

Kingsbury Maternity Hospital.—On March 30 Princess Margaret opened a new antenatal clinic and an extension to the nurses' home at the Kingsbury Maternity Hospital, Middlesex, which is one of the Charing Cross Hospital group. The Princess was received by the Lord Lieutenant of the county and Lord Inman, chairman of the board of governors of the Charing Cross Hospital. After a service of dedication conducted by the Bishop of Willesden, Princess Margaret inspected the new buildings. In his speech Lord Inman referred to the new developments as the advance guard of the new Charing Cross Hospital which is to be situated at Northwick Park. The extensions are the first completed major capital project undertaken by the board of governors since the start of the Health Service.

3-D in a Medical Journal.—Not to be outdone by lay periodicals, the current issue of *Anaesthesia* provides its readers with two three-dimensional pictures and a pair of spectacles to view them with. The claim is made that, so far as the editor is aware, this is "the first time that this type of stereogram (Roye-Vala method) has been used in a medical journal." The pictures illustrate an article by Professor E. A. Pask on intravenous injection and the risk of injury to the median nerve. Seen through the glasses, the details of the pictures stand out sharply enough, but one is left wondering whether the slight gain in clarity is really worth the extra cost and trouble.

Middle East Medical Assembly.—The British Council has arranged for Sir Lionel Whitby (Regius Professor of Physic at Cambridge), Professor John McMichael, and Dr. P. M. F. Bishop (both of the Postgraduate Medical School of London) to lecture at the Fourth Middle East Medical Assembly at Beirut, Lebanon, from April 9 to 11. Sir Lionel Whitby will afterwards visit Turkey. Professor McMichael has recently been lecturing in Syria.

Central Midwives Board.—At the meeting of the Board on April 1, Mr. Arnold Walker was re-elected chairman and Professor A. A. Moncrieff vice-chairman for the ensuing year.

Sir Charles Dodds, F.R.S., Courtauld Professor of Biochemistry at the Middlesex Hospital Medical School, London, is to receive from Cambridge University the honorary degree of D.Sc.

COMING EVENTS

Edinburgh Course in Paediatrics.—A one-day course for general practitioners will be held on April 24 at the Royal Hospital for Sick Children, Edinburgh. Further information may be obtained from the Edinburgh Postgraduate Board for Medicine, Surgeons' Hall, Edinburgh, 8.

French Medical Week.—"Les Journées Médicales de France," organized by the Société Médicale des Praticiens, will be held in Paris from April 21 to 25 under the chairmanship of Professor Camille Lian. The "Journées" are open to doctors and medical students of all countries. Further information may be obtained from the Secrétariat des Journées Médicales de France et de l'Union Française, 12, rue Pierre Geofroix, Colombes (Seine).

The Nutrition Society.—The Scottish group of the society will hold a symposium on "Nutrition and the Liver" in the Lecture Theatre, Departments of Biochemistry and Physiology, University of Glasgow, on May 8. Inquiries should be addressed to Dr. H. N. Munro, Biochemistry Department, The University, Glasgow, W.2.

First European Congress on Clinical Chemistry.—The congress will be held in Amsterdam from September 23 to 28. The main subjects for discussion will be "Isotopes in the Clinico-chemical Laboratory" and "The Physical Methods of Measurement in Connexion with Clinico-chemical Problems." Those wishing to attend should communicate with the secretary general, Ir O. Meulemans, Racinelaan 17, Utrecht, Netherlands.

NEW ISSUES

British Journal of Ophthalmology—The next issue (Vol. 38, No. 4) is now available. The contents include:

ARGEMONE OIL, SANGUINARINE, AND EPIDEMIC-DROPSY GLAUCOMA. Sohrab A. E. Hakim.
LATENT NYSTAGMUS AND ALTERNATING HYPERPHORIA. J. Ringland Anderson.
THE CORNEO-SCLERAL SUTURE: A TECHNICAL MODIFICATION. H. B. Stallard.
THE CORNEO-SCLERAL TRACK SUTURE: A NEW TECHNIQUE. Mahmud Ali Shah.
THE DARK-ROOM TEST. A. C. Higgit.
RETINAL IRRADIATION AND ANISEIKONIA. R. A. Weale.

Issued monthly; annual subscription £4 4s.; single copy 8s. 6d.

Abstracts of World Medicine.—The April issue (Vol. 15, No. 4), which is now available, contains abstracts of important papers drawn from medical and other scientific journals published in some 20 different countries and in all five continents. The subjects covered range over the whole field of clinical medicine and include pathology, bacteriology, pharmacology, and chemotherapy; there are also sections dealing with medical genetics, public health, industrial medicine, forensic medicine and toxicology, anaesthetics, radiology, and the history of medicine.

Issued monthly; annual subscription £4 4s., single copy 8s. 6d.; a specimen will be sent free on request.

These journals are obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Applications should be made first to the institution concerned.

Monday, April 12

MEDICAL SOCIETY OF LONDON.—8.30 p.m., meeting of Fellows. Discussion to be introduced by Air Commodore T. C. MacDonald and Dr. I. J. Corbett: Medical Aspects of Air and Sea Travel.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. H. Osmond-Clarke: Fractures of the Upper End of the Femur; 6.30 p.m., Mr. R. C. Brock: Some Aspects of Surgery of the Heart.

Tuesday, April 13

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. Charles Donald: Surgery of the Neck in Infancy and Childhood; 6.30 p.m., Mr. N. R. Barrett: Empyema.

WEST END HOSPITAL FOR NERVOUS DISEASES.—5.30 p.m., neurological demonstration by Dr. B. G. Parsons-Smith.

Wednesday, April 14

HARVEIAN SOCIETY OF LONDON.—8.15 p.m., discussion to be introduced by Dr. George Warren and Dr. Michael Ward: Health at High Altitudes.

NORTH-WESTERN TUBERCULOSIS SOCIETY.—At Aintree Hospital, Liverpool, 5.30 p.m., Mr. Dillwyn M. E. Thomas: Treatment of Tuberculous Mediastinal Lymph Glands and their Complications.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Sir Reginald Watson-Jones: Injuries of Joints; 6.30 p.m., Mr. J. Cosbie Ross: Renal Tuberculosis.

ROYAL EYE HOSPITAL.—5.30 p.m., Mr. L. H. Savin: Ophthalmic Neurology (2).

SOUTHEND GENERAL HOSPITAL.—At Recreation Hall, General Hospital, Rochford, 8 p.m., First Sydney Body Lecture by Sir Francis Walshe, F.R.S.: The Changing and the Unchanging Face of Medicine.

APPOINTMENTS

GUNN, WILLIAM, M.B., Ch.B., D.I.H., Chief Medical Officer, North Thames Gas Board.

HART, DAVID MCKAY, M.B., Ch.B., F.R.F.P.S., F.R.C.O.G., Consultant Obstetrician and Gynaecologist, Stobhill Hospital, Glasgow.

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, London, W.C.—J. N. Montgomery, M.D., M.R.C.P., D.C.H., Resident Assistant Physician; E. P. J. Silberstein, M.B., B.S., House-physician to Neurological and Neurosurgical Department; Daphne M. Kirkman, M.B., B.S., and T. J. Parkinson, M.B., Ch.B., M.R.C.P., D.C.H., House-physicians; B. J. Penry, M.R.C.S., L.R.C.P., House-surgeon; Mary F. Thomson, M.B., Ch.B., Resident Medical Officer, Tadworth Court.

MANCHESTER REGIONAL HOSPITAL BOARD.—H. Bolton, M.B., Ch.B., F.R.C.S., Consultant Orthopaedic and Accident Surgeon, Stockport and Macclesfield Hospital Centres and Crewe Memorial Hospital; R. M. Fulton, M.D., M.R.C.P., Consultant Physician, Stockport and Buxton Hospitals; H. B. Andrews, M.B., Ch.B., Deputy Superintendent and Resident Medical Officer, Wrightington Hospital; K. Sen Gupta, M.B., D.A., Assistant Anaesthetist, Bury and Rossendale Hospitals; N. J. Roussak, M.B., Ch.B., M.R.C.P., Consulting Physician to Withington and Wythenshawe Hospitals, Manchester; Z. Golen, M.B., Ch.B., Assistant Psychiatrist, Whittingham Hospital, Preston.

NORTH-EAST METROPOLITAN REGIONAL HOSPITAL BOARD.—J. Littlejohn, M.B.E., M.R.C.S., L.R.C.P., D.L.O., Part-time Consultant Ear, Nose, and Throat Surgeon, Chelmsford and Essex Hospital and St. John's Hospital, Chelmsford; W. F. Dunham, B.M., B.Ch., D.Phys.Med., Part-time Consultant Physician in Physical Medicine, Vale Road School Spastic Unit, Tottenham; B. Fairburn, M.B., F.R.C.S., D.A., Maximum Part-time Consultant Neurosurgeon, Oldchurch Hospital, Romford; N. A. Thorne, M.D., M.R.C.P., Part-time Consultant Dermatologist, Mile End, St. George-in-the-East, and St. Andrew's, Bow, Hospitals; G. Grunberger, M.D., D.L.O., Part-time Consultant Ear, Nose, and Throat Surgeon, St. Margaret's, Epping, and Honey Lane, Waltham Abbey, Hospitals; R. W. Crocket, M.B., F.R.F.P.S., M.R.C.P.Ed., D.P.M., Part-time Consultant Psychiatrist, Oldchurch and St. George's, Hornchurch, Hospitals; J. J. F. O'Sullivan, M.B., B.Ch., M.R.C.O.G., Part-time Consultant Gynaecologist, Whipps Cross Hospital; G. C. Pritchard, M.B., F.R.C.S., D.O.M.S., Part-time Consultant Ophthalmic Surgeon, East Ham Memorial Hospital; D. V. Martin, M.R.C.S., L.R.C.P., D.P.M., Full-time Consultant Psychiatrist and Deputy Physician Superintendent, Claybury Hospital; Margaret M. Mason, M.B., F.R.C.S., Part-time Consultant Ear, Nose, and Throat Surgeon, Ilford and Barking Group of Hospitals and Clinics.

NORTH-WEST METROPOLITAN REGIONAL HOSPITAL BOARD.—Rosalind Vacher, M.B., Ch.B., D.P.M., Consultant Child Psychiatrist, Hoddesdon Child Guidance Clinic. Hilda C. Abraham, M.D., Consultant Psychiatrist, British Hospital for Functional Nervous Disorders. H. J. M. Stratton, Consultant Ear, Nose, and Throat Surgeon, Ashford Hospital, Ashford. F.R.C.S.Ed., D.L.O., Consultant Ear, Nose, and Throat Surgeon, Ashford Hospital, Ashford, Middlesex. H. S. A. Henry, M.B., B.Ch., F.R.C.S.I., D.P.H., D.L.C., Consultant Ear, Nose, and Throat Surgeon, Hornsey Central Hospital. E. F. G. Stewart, F.R.C.S.Ed., Consultant Ear, Nose and Throat Surgeon, Finchley Memorial Hospital; also at Northwood, Pinner and District Hospital, Northwood, Middlesex. C. P. C. Gore, M.D., M.R.C.P.I., D.P.M., Assistant Psychiatrist (S.H.M.O.), Child Guidance Training Centre, N.W.

ROBERTS, GRIFFITH WYN, M.B., B.Ch., D.P.H., County Medical Officer and School Medical Officer, Flintshire County Council.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Bihari.—On March 27, 1954, at University College Hospital, London, W.C., to Mac (formerly McMullan), wife of Julian Bihari, F.R.C.S., a brother for Katherine Anne—David Julian.

Cantor.—On March 27, 1954, at the Kent and Canterbury Hospital, to Kathleen, wife of Dr. Jack Cantor, D.Obst.R.C.O.G., of Kent Lodge, Faversham, Kent, a brother for Timothy.

Evans.—On March 19, 1954, at the Norfolk and Norwich Hospital, to Evelyn (formerly Smith), wife of Dr. Trevor Evans, a son—Andrew Leighton.

Gresham.—On March 28, 1954, at Mill Road Hospital, Cambridge, to Gweneth Margery (formerly Leigh), M.B., B.S., wife of Geoffrey Austin Gresham, M.B., B.Chir., a daughter—Diana.

Shribman.—On March 28, 1954, at the Royal Buckinghamshire Hospital, Aylesbury, to Hazel (formerly Isaacs), wife of Irving Shribman, M.B., B.Ch., D.P.M., of the Old Vicarage, Stone, Aylesbury, Bucks, a son.

White.—On March 20, 1954, at the Birmingham Maternity Hospital, to Frances Mary (formerly Cottam), M.B., Ch.B., wife of Dr. H. M. White, a son.

DEATHS

Cole.—On March 18, 1954, at 110, Cooden Drive, Bexhill-on-Sea, Sussex, Sydney John Cole, D.M., aged 83.

Collen.—On March 21, 1954, at The Limes Nursing Home, Jacob Post, Burgess Hill, Sussex, George Denbigh Collen, M.D., aged 86.

Freedlander.—On March 19, 1954, at Manchester Royal Infirmary, Isaac Harry Freedlander, M.B., Ch.B., of 618, Oldham Road, Failsworth, Manchester.

Gurney.—On March 18, 1954, at The White House, Grainger Park Road, Newcastle-upon-Tyne, Helen Mary Gurney, M.D., aged 79.

Halley.—On March 23, 1954, at Forester Hill, Aberdeen, Thomas Curr Halley, M.B., Ch.B., late of Bath, Somerset, aged 67.

Jacques.—On March 18, 1954, in a nursing home, Carlisle, Cumberland, Frederick Viel Jacques, V.R.D., M.B., Ch.B., D.P.H., D.T.M.&H.

Jones.—On March 23, 1954, at Aberdare, Glam, Martin Llewelyn Jones, F.R.C.S., D.P.H.

Melville.—On March 25, 1954, Charles Melville, M.B., Ch.B., D.P.H., late of Grangemouth, Stirlingshire.

Milligan.—On March 21, 1954, in hospital, Ernest Henry Marcus Milligan, M.D., D.P.H., of Daisy Bank, Hadfield Road, Hadfield, Derbyshire, formerly of Glossop, Derbyshire.

Schwarzwald.—On March 18, 1954, Raimund Theodor Schwarzwald, M.D., of London, W.

Visger.—On March 21, 1954, at "The Paddocks," Chippenham, Wilts, Charles Visger, O.B.E., M.R.C.S., L.R.C.P., of Clevedon, Somerset, aged 79.

Walker.—On March 23, 1954, at the Old Manse, Tyndrum, Perthshire, Robert Alexander Walker, M.B., F.R.C.S., late of Peterborough, aged 79.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Drugs in Breast Milk

Q.—*What drugs in common usage are excreted in the breast milk in amounts likely to have a harmful effect on the infant? In particular, I am interested in antihistamine drugs, sulphonamides, antibiotics, barbiturates, aspirin, and purgatives.*

A.—Definite clinical evidence exists that breast-fed infants may suffer ill-effects if the mother is receiving bromide and iodide, ergot alkaloids, or thiouracil compounds. Excessive maternal consumption of alcohol or nicotine (cigarette smoking) has also been followed by symptoms in the suckling. Active constituents of purgatives of the anthracene group (cascara, senna, etc.) may be excreted in sufficient quantity to affect the baby, and it is wise to avoid their use in the nursing mother. Liquid paraffin is a suitable preparation to use. There is some evidence that sufficient amounts of the barbiturates and phenytoin may be excreted in breast milk to cause drowsiness in the baby. Caffeine, hyoscine, morphine, codeine, and atropine are either not excreted at all or only in insignificant quantities.

Other drugs which are excreted in breast milk, but in insufficient concentration to have a deleterious effect on the infant, include sulphonamides, antihistamines, salicylates, penicillin, streptomycin, chloramphenicol, terramycin (oxytetracycline), and aureomycin.

Ammoniacal Dermatitis in Infants

Q.—*In view of the possible dangers of mercury absorption, particularly pink disease, is it unwise to continue prescribing conspersus hydrarg. subchlor. co. for ammoniacal dermatitis in infants? If so, what alternative treatment is recommended?*

A.—The use of local applications containing mercury is contraindicated. Likewise rinsing of previously washed napkins in a saturated (or weaker) solution of boracic acid crystals is undesirable. Effective local treatment consists in the use of destructible napkins; bathing the affected parts in warm normal saline after each toileting; and applying pure lanoline if there is severe excoriation, the lanoline being replaced by dusting with a high-grade infant powder as the condition improves. If, as is frequently the case, the stools are abnormal in character, necessary feeding adjustments should be made.

Lipuria and Chyluria

Q.—*A woman of 22 has visible lipuria. Diabetes, pregnancy, fracture, and phosphorus poisoning have been excluded as the cause. How should she be investigated now, and what possibilities must be considered?*

A.—It is essential to determine whether the urine contains fat globules only (lipuria) or fat globules together with protein, fibrinogen, and a few red cells. In lipuria the fat globules can be recognized with a microscope, using the low power objective and ordinary lighting; in chyluria the fat globules are much smaller, but they can be seen with a high power objective, if dark ground illumination is used.[1]

The only other condition, besides those mentioned, which may cause lipuria is said to be a severe chronic nephritis, which can easily be excluded. It is therefore unlikely that the patient has lipuria. Chyluria is due to blocking of a main branch of the receptaculum chyli. If the patient has been abroad the lymphatics may have been blocked by filarial parasites. A more likely cause in this country is

obstruction of the duct due to the after-effects of a tuberculous peritonitis, or pressure of a gland which is infiltrated with tuberculosis, lymphadenoma, or malignant disease. If the abdomen is opened for any cause the appearance is striking, as the lacteals are greatly distended and glistening white. The condition can be improved if the patient will tolerate a low fat diet.

REFERENCE

1 Harrison, G. A. (1947). *Chemical Methods in Clinical Medicine*, 3rd ed. Churchill, London.

Immunity after Tetanus Toxoid

Q.—*How soon after inoculation with tetanus toxoid does reasonable protection develop?*

A.—It is usually accepted that protection is significant ten days after the second of two injections of 1 ml. of tetanus toxoid at an interval of 6 weeks. A third dose should be given 9 to 12 months later to complete the primary course.

Tetanus Toxoid and Combined Prophylactics

Q.—*If three doses of tetanus toxoid are given at appropriate intervals in childhood, will a useful amount of active immunity against tetanus persist into adult life? If so, can a combined vaccine against diphtheria, whooping-cough, and tetanus be recommended?*

A.—In the Services the usual primary course of three well-spaced injections of tetanus toxoid gives a useful degree of active immunity, but it is reinforced in peacetime by boosting doses at intervals of five years. It is unlikely that a more durable immunity will develop in young children than in adults. As there is no maternally transferred passive immunity to tetanus in young babies, the first dose (0.5 ml.) of tetanus toxoid may be given in the early weeks of life without risk of any interference with the responses of the antibody-producing mechanism. After the full primary course in the first year we do not yet know how many five-yearly boosting doses may be necessary, but it seems likely that after two or three such doses further boosting need be very infrequent.

A combined prophylactic against diphtheria, tetanus, and whooping-cough is strongly recommended for primary immunization at the age of 3 to 4 months *at the earliest*. Three doses are given at intervals of four to six weeks for the primary course, followed by one reinforcing dose at the age of 12 to 15 months. Above the age of 5 years the pertussis constituent is no longer required, but further boosting is essential with either a combined diphtheria and tetanus preparation or the single prophylactics.

Episcope, Diascope, and Epidiascope

Q.—*What is the difference between an episcope, a diascope, and an epidiascope? How do they work, and for what type of material is each best suited?*

A.—An episcope is an apparatus for projecting images of opaque objects, such as illustrations, graphs, and diagrams, by reflection. A diascope projects transparent images and is made to use with either standard British lantern slides (3¼ in. square—8.2 cm. square) or miniature slides (2 in. square—5.1 cm. square) and 35-mm. film strips.

To-day episcopes are rarely constructed as a separate instrument, but are more usually combined with the diascope to make the composite instrument known as the epidiascope, which can be rapidly adapted to work with either an opaque image or a transparency.

In the case of a diascope or lantern-slide projector the light is concentrated on the transparency by means of a condenser lens, and a brilliant image is obtained. However, this cannot be done with an episcope, and the image of an opaque object is never very bright. Thus to obtain good quality results all illustrations should be photographed and transparencies prepared. Episcopic projection should be reserved for colour pictures which cannot readily be photographed and for other material required urgently.

Oestrogens in Mumps

Q.—*The treatment of mumps orchitis by oestrogens seems to work in my very small experience of this condition. Can you tell me if androgens or oestrogens are of any use for mumps oophoritis?*

A.—I am not aware of any reports on the treatment of mumps oophoritis with oestrogens or androgens. The incidence of the complication is extremely small as compared with orchitis, and such few cases as I have encountered resolved naturally so rapidly that it would be difficult to evaluate attempts at treatment or prophylaxis by these preparations. Incidentally, more recent reports on the use of diethylstilboestrol for the prevention of mumps orchitis have been discouraging, but a somewhat cautious acceptance of its use in treatment is allowed, with which I agree.

NOTES AND COMMENTS

Craving for Salt.—Dr. M. N. GHOSH (London, N.W.5) writes: In view of the recent revival of the fairly old concept that the dietary sodium might be a primary cause of arterial hypertension,[1] I wonder whether one is justified in summarily dismissing the topic by concluding that craving for salt is a harmless oddity ("Any Questions?" February 27, p. 532). During recent years salt restriction (sodium ion) in diets has become too well-known a regime in management of cases of oedema and hypertension, and probably the question was put forward by the inquirer with this background in mind. If a salt restriction in diet produces a fall in raised blood pressure, it is quite logical to think of its corollary that hypertension might well be produced by an excessive intake of salt (sodium ion). It is true that one should not be led only by logic, and definite experimental evidence must be put forward either to support or to reject the theory. A glimpse into the available literature throws some light on this direction. By chronically feeding with diets rich in sodium chloride, a group of workers[2] has been able to produce a sustained arterial hypertension in albino rats. Moreover, a positive linear correlation was found between systolic blood pressure and concentration of sodium chloride in diets. They have also been able to produce a syndrome of oedema and renal failure associated with significant histological changes in kidneys and other organs in a certain percentage of their rats. These observations, although they do not bear any direct relationship to human hypertension, definitely point towards some possibilities that can be proved or disproved only by long-term experiments on humans.

OUR EXPERT writes: It is not logical to assume that because a low sodium diet lowers the blood pressure a high sodium diet will cause essential hypertension. It is known, of course, that a high sodium diet, particularly in conjunction with desoxycorticosterone, increases the blood volume and that this tends to raise the blood pressure a little if there is no compensatory vasodilatation. It is also known that the blood volume in essential hypertension is normal. I do not know of any careful research work proving that a high sodium intake over the years does not in fact produce essential hypertension, but the possibility is purely speculative, and has nothing to support it.

REFERENCES

1 Allen, F. M., and Sherrill, J. W. (1922). *J. Metab. Res.*, 2, 429.
2 Meneely, G. R., *et al.* (1953). *J. exp. Med.*, 98, 71.

"Any Questions?" Book.—The second book of selected "Any Questions?" is available, price 7s. 6d. (postage 6d.). Copies may be obtained either direct from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1, or from booksellers.

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